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THE IRON AGE

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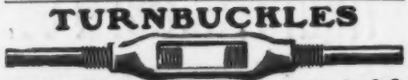
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Frick Building, PITTSBURGH
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ality and Service are prominent features h us.
See Ad. on Page 15.

TRADE MARK REG. IN U.S. PAT. OFF.
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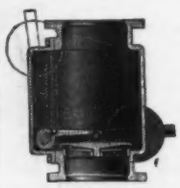
SHOT SHELLS
U.M.C. CO. No 12 ARROW
ARE SURE FIRE, UNIFORM AND HARD HITTING
U.M.C. CO. No 12 NITRO CLUB
Hundreds of car loads of U. M. C. shells were shipped during the last hunting season to the quail sections. There was a tremendous and popular UMC demand. Carry UMC shells and be hunted up by sportsmen who prefer the best.
Arrow and Nitro Club loaded with Smokeless powder and New Club loaded with black powder.
The Union Metallic Cartridge Company
Write to M. HARTLEY COMPANY, Sole Representative, 313-315 Broadway, New York City.

WATER TUBE BOILERS *The* Babcock & Wilcox Co., 85 Liberty Street, New York
See page 53

The Best Selling Nail in the World
"THE CAPEWELL" HORSE NAIL
¶More "Capewell" nails are sold in the United States each year *than of all other brands combined.*
¶This makes trade for the Hardware merchants—a very profitable trade, too.
Always Carry "Capewell" Nails in Stock.
Made by
The Capewell Horse Nail Co., Hartford, Conn. U. S. A.
THE LARGEST MANUFACTURERS OF HORSE NAILS IN THE WORLD.
1908 Calendar Free upon application.


Excelsior Straightway Back-Pressure Valve
has a full, unobstructed passage through it nearly in line with the pipe, and therefore offers no resistance to the free flow of steam. Thoroughly reliable when used as a back pressure valve, it is also adapted for use as a relief or free exhaust valve for condensers. By changing position of outside lever, it will work equally well in a vertical or horizontal position.
JENKINS BROS., New York, Boston, Philadelphia Chicago, London

"Swedoh" Cold Rolled Steel is unexcelled for **Drawing** and **Stamping**
THE AMERICAN TUBE & STAMPING COMPANY
(Water and Rail Delivery) BRIDGEPORT, CONN.
SEE PAGE 23

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The Standard Babbitt of the World
We manufacture everything in the Babbitt Line.
MAGNOLIA METAL CO.
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Phosphor and Deoxidized Bronze
Composition, Yellow Brass and Aluminum Castings, large and small

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SHEET ZINC AND SULPHURIC ACID
Special Sizes of Zinc cut to order. Rolled Battery Plates.
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GERMAN SILVER
THE RIVERSIDE METAL CO.
RIVERSIDE, N. J.

THE IRON AGE

New York, Thursday, March 26, 1908.

Rolling Mill Equipment for Japan.

A tribute to the worldwide reputation which American made steel mill machinery has acquired in the years that its manufacturers have developed it in the competition to supply domestic plants is the order recently filled by the Mesta Machine Company, Pittsburgh, Pa., for the Imperial Steel Works of Japan, through Mitsui & Co. 40 x 48 in. Corliss tandem compound engine, a 16 x 60 in. three-high roughing mill and a 10-in. merchant mill of four stands, 36 x 30, 14 and 12 in.; a heavy motor driven roll turning lathe, four shears and a cold draw bench. The reliability and shock absorbing characteristics of power transmission by rope drive will be made use of in the case of the four stand 10-in. mill, which will be driven by 12 1¾-in. ropes in multiple from the 16-ft. 60,000-lb. rope wheel of the engine. A cast steel crab,

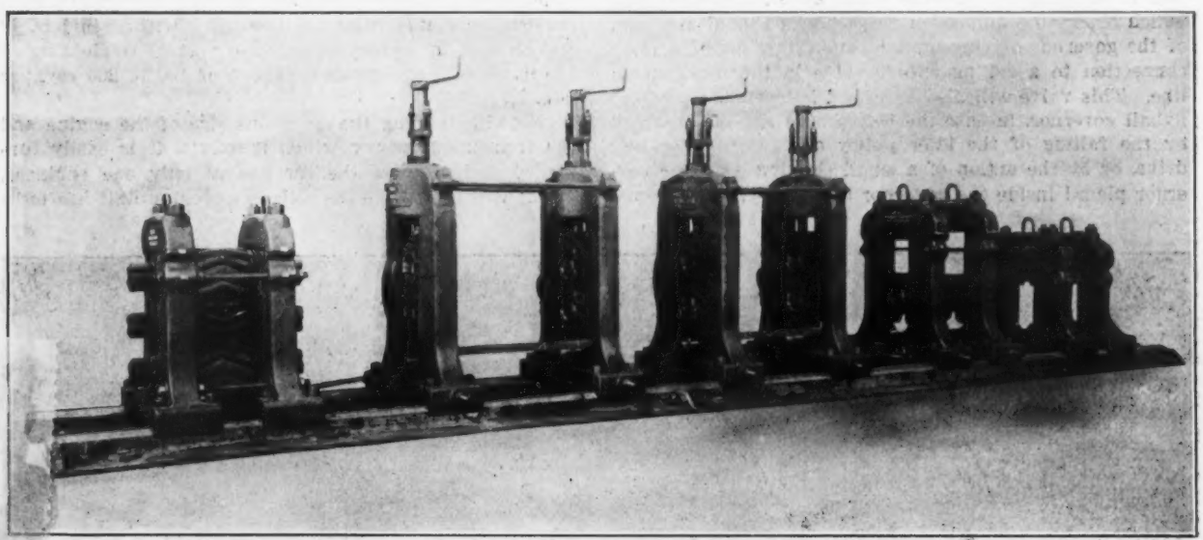


Fig. 1.—Ten-In. Merchant Mill with Four Stands 36 x 30, 14 and 12 In.

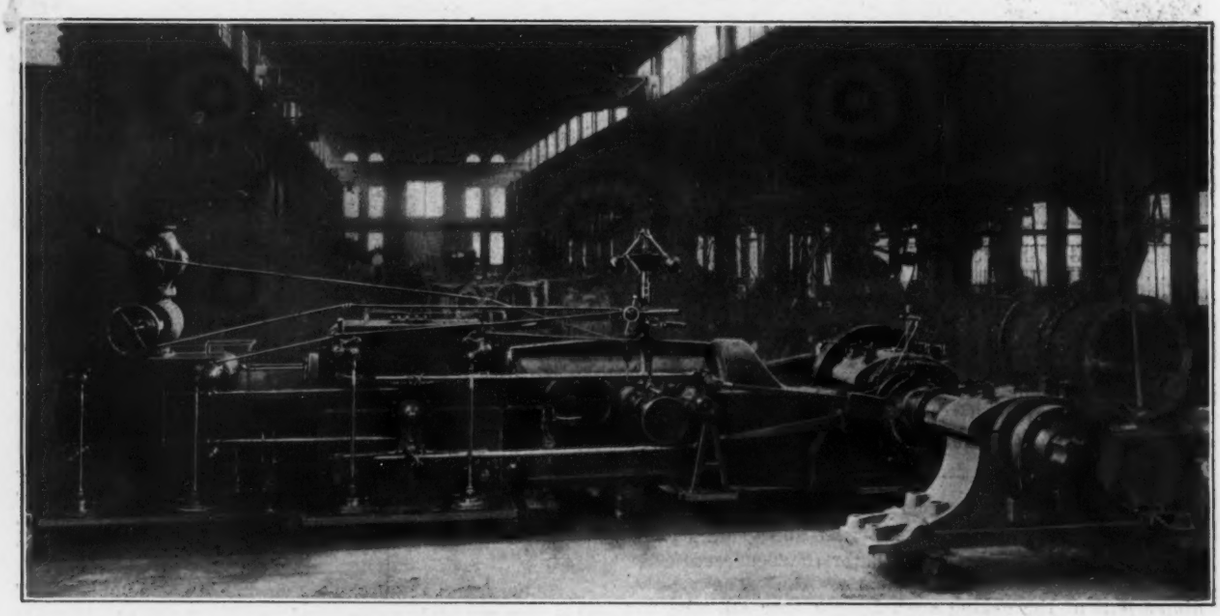


Fig. 2.—1300-Hp. 26 and 40 x 48 In. Corliss Tandem Compound Engine.

Rolling Mill Equipment Built for the Imperial Steel Works of Japan by the Mesta Machine Company, Pittsburgh, Pa.

The development of the iron and steel industry in Japan has been largely aided by the study which the representatives of that country have given to the methods employed in the United States. By using foreign built machinery the Japanese are able to meet the demand for finished product quicker than they would if the equipment was designed and built in Japan, where the lack of experience and manufacturing facilities are serious handicaps.

The order above alluded to included a 1300-hp. 26 and coupling directly, will connect the 16-in. mill to the engine shaft, which is designed to run at 100 rev. per min.

The mills, which are designed for rolling tool steel, are of exceedingly heavy construction. Cast steel double helical machine molded pinions drive the chilled rolls, which are set in cast steel bronze lined journal boxes carried by very heavy housings of air furnace iron. The three-high 16-in. roughing mill, which is directly connected to the engine shaft, receives 5 x 5 in. 200-lb. billets. These are then passed to the 10-in. finishing mill, a

view of which is given in Fig. 1. This mill has two three-high stands and two two-high stands, and is designed to turn out rounds from 10 to 50 mm. (⅜ to 2 in.) diameter, squares from 9 to 50 mm. (⅜ to 2 in.), and flats from 10 x 12 mm. (⅜ x ½ in.) to 35 x 55 mm. (1⅜ to 2⅛ in.).

The engine, as shown in Fig. 2, is a heavy design especially fitted to meet the exacting demands of rolling mill work. Air furnace iron was used for the larger castings, such as the cylinders, flywheel and the heavy one-piece frame. A tongue and groove attachment for the cylinders to the sole plate assures perfect alignment, and at the same time obviates the expansion strains due to temperature changes. The use of double eccentrics affords a wide range in engine power, giving a cut-off variation up to three-quarter stroke.

The matter of automatic safety devices, always of great importance, has received particularly careful attention in this engine. To the usual flyball governor stop, which blocks the admission valve hooks should any part of the governor driving mechanism fail, is added a lever connection to a rolling cut-off valve in the main steam line. This valve will also be closed independently of the flyball governor, in case the belt should run off or break by the falling of the idler pulley on the governor belt drive, or by the action of a small shifting eccentric governor placed inside the governor belt pulley. This eccentric governor is set to operate at 5 per cent. above normal speed.

The four motor driven shears are intended for cutting 2 x 2 in. bars and ½ x 2 in. flats, together, and the cold draw bench is capable of exerting a pull of 40,000 lb.

The Mesta Machine Company, Pittsburgh, recently made shipment of a twin reversing engine to be directly connected to a roughing rail mill for the Tennessee Coal, Iron & Railroad Company, Ensley, Ala. The general dimensions of the engine are: Length over all, 50½ ft.; width, 29½ ft.; weight, 850,000 lb.; cylinders, 55 in. diameter by 66 in. stroke. The contract calls for operation with 150 lb. steam pressure and a speed of 150 rev. per min., under which conditions and a three-quarter cut-off the engine will develop 27,000 hp. In general, the engine is twin simple with piston valve gear, and, following the usual Mesta custom, shows a massive construction to stand the shocks and severe service encountered in reversing mill work.

The Massillon Iron & Steel Company, Massillon, Ohio, engineer, founder and machinist, is making some large additions to its plant which will considerably increase its capacity.

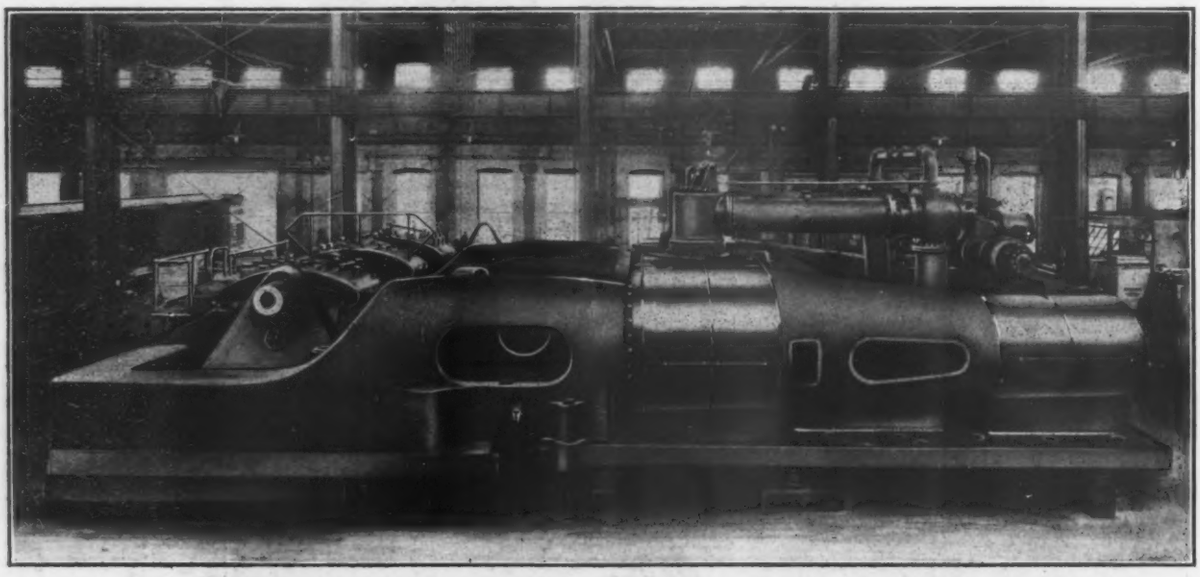
The Largest Engine in the World.

The United States Steel Corporation has recently installed in the mills of the Carnegie Steel Company at South Sharon, Pa., the most powerful engine ever built. It has a capacity of 25,000 hp., or nearly double the size of its nearest rival, and was erected complete in the engine building shops of the Allis-Chalmers Company at West Allis, near Milwaukee, Wis.

Some idea of the size of this engine is afforded by the illustration, which shows it contrasted with a man of average hight. Two of the castings for it weighed, after machining, 118 tons each, requiring for their transportation the special reinforced 100-ton cars built in the Chicago, Milwaukee & St. Paul Railroad shops at Milwaukee for Allis-Chalmers Company for just such purposes as this. The engine as a whole weighs 550 tons without foundation plates or flywheel. It is a horizontal, twin tandem compound rolling mill engine, with cylinders 42 and 70 x 54 in. stroke, designed to operate condensing at 175 lb. steam pressure and a speed of 150 to 200 rev. per min.

Notwithstanding the enormous size of the engine and the tremendous power which it exerts, it is easily controlled and requires the services of only one engineer. Being used to operate the rolls in a steel mill, it has to be quickly reversed at the end of each run, and the load varies within a few moments from nothing to the maximum power exerted. The reversing mechanism used for changing the direction of the engine is of the Reynolds-Marshall type and is run by a small independent engine with oil cylinder lock. Another small engine is also employed in operating the steam throttle valves, all of these units being under the perfect control of the one engineer. No more than a few seconds' time is consumed in the reversing.

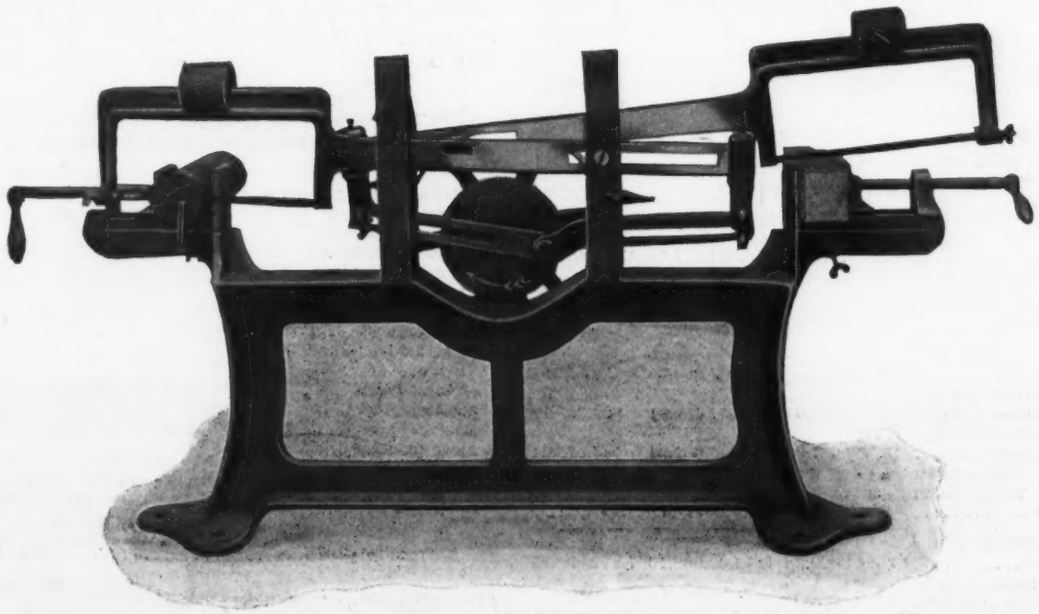
Some years ago the work of installing a machine of this size would have required months, with considerable additional time spent in getting it ready for service, but this company has built so many huge engines of this class that its engineers and erecting men have acquired great facility in the work. An instance of it is the installation of an engine which preceded the 25,000-hp. unit above referred to. This was placed on its foundation and completely assembled within 10 days after arrival at the mill, notwithstanding that before the new engine could be erected an old one which had been kept in service until the last minute had to be torn out. Most remarkable of all is the fact that within 30 min. after the last bolt had been adjusted and steam admitted to the cylinders, the engine was doing its full work rolling rails, and remained continuously in operation thereafter.



The 25,000-Hp. Allis-Chalmers Tandem-Compound Rolling Mill Engine for the Carnegie Steel Company, as It Appeared Partly Erected in the Builder's Shop.

The Ryerson Tandem Hack Saw.

A rather unusual type of power hack saw is the double tandem one illustrated, which is being offered by Joseph T. Ryerson & Son, Chicago. Besides effecting a saving in floor space and auxiliary equipment, it is designed to reduce the cost of maintenance, lubrication and attendance, which would attend the operation of two separate machines. As will be observed, both saws are mounted on a single frame, and are reciprocated by a single crank mounted on the pulley shaft at the center of the machine. The driving arms are carried in two upright guide yokes, which serve to keep the saws in alignment.



A Two-in-One Tandem Power Hack Saw Sold by Joseph T. Ryerson & Son, Chicago, Ill.

On the forward or cutting stroke a downward pressure is exerted, which results in faster cutting, and on the return stroke, when the saw is not cutting, the pressure is relieved by the lifting motion imparted to the arm. Each saw is fitted with an independent automatic stop, which engages the holding clamp at the end of the slotted driving arm and stops the saw when the cut is finished.

Vises with swivel jaws capable of adjustment to material of various shapes are provided; they are removable and are so fitted as to insure contact of the saw through the entire length of the blade. The machine occupies a floor space of 12 x 48 in., weighs 260 lb., and carries a pulley 14 in. in diameter by 3-in. face, which should run at a speed of from 65 to 75 rev. per min.

Twenty-three of the district managers of the Westinghouse Electric & Mfg. Company concluded last week a meeting at East Pittsburgh. They were summoned together to report on conditions in the various fields, such meetings being held annually. As to the business outlook, the managers were divided in opinion, those from the West predicting that the trade record for this year would be as good as that of 1907, and the Eastern managers saying they expected a decrease. All were united, however, in the belief that business has begun to pick up all over the country. It was concluded, after all reports were heard, that the electrical business for 1908, compared with that of 1907, will not show as great a loss as has been anticipated.

The Murchie Safety Clamp Collar.

That the projecting heads of set screws in shaft couplings and other revolving parts are a menace is so well known that any device to eliminate them is of timely interest. What is designated by the patentee and maker, S. T. Murchie, Kaukauna, Wis., as a safety clamp collar, is represented to combine the desired features of safety, simplicity and ease of application, together with practical efficiency. The coupling is shown in the accompanying illustration assembled and disassembled.

It consists of two parts, composed of the collar proper and a binder ring, both of which are of steel. The former is made with a projecting sleeve, carrying two slightly tapered bosses on its outer surface opposite to each other, and is split longitudinally on one side. Grooved ways are cut on the inside of the compression ring corresponding in position to the collar bosses. When in position the ring is slipped on the collar, and set up to the shoulder, the wedge taper of the bosses being sufficient to compress the collar and cause it to firmly grip the shaft.

A Clamping Collar or Shaft Coupling Devoid of Dangerous Projecting Parts, Made by S. T. Murchie, Kaukauna, Wis.

Held solely by a friction clutch thus applied there are no set screws in this coupling to mar the shafting or catch the clothing of employees or others. It is, moreover, easily adjusted and removed, and avoids as far as practicable the preventable accidents occasioned by the old style collar with protruding set screws. This clamp coupling is furnished in sizes to fit all shafting of ordinary diameters.

The United States Steel Corporation's Annual Report.

Gross Sales and Earnings $757,014,767.68. Increase Over Best Previous Year $60,257,876.67.

Net Earnings $160,964,673.72. Increase Over Best Previous Year $4,340,400.54.

The sixth annual report of the United States Steel Corporation, covering the operations of the fiscal year ending December 31, 1907, shows that its gross sales and earnings far surpassed those of any previous year. The business thus transacted totaled the stupendous sum of $757,014,767.68, which was $60,257,876.67 in excess of the amount reached in 1906, when a new record was made. The net earnings were $160,964,673.72, exceeding those of the previous year by $4,340,400.54. The report, which includes operating results of the Tennessee Coal, Iron & Railroad Company, for November and December, enables the following comparisons to be made.

Income Account.

	1907. $	1906. $	Increase. $
Earnings	160,964,673.72	156,624,273.18	4,340,400.54
Less appropriations for the following purposes:			
Sinking funds on bonds of subsidiary companies	1,977,761.03	1,904,063.50	73,697.53
Depreciation and extinguishment funds	6,681,746.03	5,857,410.91	824,335.12
Extraordinary replacement funds	15,560,237.38	15,395,860.64	164,376.74
Special replacement and improvement funds	3,500,000.00	7,500,000.00	*4,000,000.00
Net earnings in the year	133,244,929.28	125,966,938.13	7,277,991.15
Deduct interest on U. S. Steel Corporation bonds outstanding	22,860,352.82	22,839,849.98	20,502.84
Sinking funds on U. S. Steel Corporation bonds—viz.:			
Installments	4,050,000.00	4,050,000.00	.....
Interest on bonds in sinking funds	1,087,497.18	858,000.02	229,497.16
	105,247,079.28	98,219,088.13	7,027,991.15
Less charged off for various accounts and adjustments	681,515.52	90,501.19	591,014.33
Balance	104,565,563.76	98,128,586.94	6,436,976.82
Less dividends on preferred stock, 7 %	25,219,677.00	25,219,677.00	.....
Dividends on common stock, 2 %	10,166,050.00	10,166,050.00	.....
Surplus net income for the year	69,179,836.76	62,742,859.94	6,436,976.82
Appropriated from surplus net income for the following purposes:			
Account expenditures on authorized appropriations for additional property, new plants and construction, and for discharge of capital obligations	35,500,000.00	28,500,000.00	7,000,000.00
Set aside for construction of plant at Gary, Ind.	18,500,000.00	21,500,000.00	*3,000,000.00
Balance of surplus for the year	15,179,836.76	12,742,859.94	2,436,976.82

* Decrease.

Employees and Pay Rolls.

The average number of employees in the service of all companies during the fiscal year 1907, in comparison with the fiscal year 1906, was as follows:

	1907.	1906.
Manufacturing properties	151,670	147,048
Coal and coke properties	21,447	21,929
Iron ore mining properties	16,462	14,393
Transportation properties	18,133	16,638
Miscellaneous properties	2,468	2,449
Totals	210,180	202,457
Total annual salaries and wages	$160,825,822	$147,765,540

On January 1, 1907 (on March 1, 1907, in case of the coke companies), an advance was made in the wages and salaries of approximately 65 per cent. of the total employees of all companies. This advance increased the wages and salaries of the employees affected about 6 6-10 per cent. The average rate of wages and salaries paid all employees during 1907 was above 5 per cent. higher than the similar average rate in the next preceding year.

Statement of Surplus.

The net profits and surplus of the corporation and its subsidiary companies since April 1, 1901, are given as follows:

Capital surplus provided at date of organization			$25,000,000.00
Aggregate quarterly net profits		$515,303,938.08	
Less amount included therein representing accrued profits on inter-company materials on hand in inventories	$10,371,803.25		
Charges against profits made at close of fiscal years, not applicable to particular quarters	7,513,699.74		
Reserve to cover possible failure to realize advanced mining royalties	2,500,000.00		
		20,385,502.99	
Balance of profits earned			494,918,435.09
			$519,918,435.09
Dividends paid on U. S. Steel stock:			
Preferred, 47¼ per cent		$193,755,597.66	
Common, 13½ per cent		68,598,982.50	
			262,354,580.16
Leaving a surplus of			$257,563,854.93
Of the foregoing surplus the following amounts have been appropriated for the purposes named:			
For payment of construction and capital expenditures and special charges per fifth annual report		$108,827,364.16	
For payment of construction and capital expenditures and for reserve for contemplated appropriations, per income account for 1907		54,000,000.00	
			162,827,364.16
Balance of surplus, December 31, 1907, exclusive of subsidiary companies' inter-company profits in inventories			$94,736,490.77
Undivided surplus of subsidiary companies on December 31, 1907, representing profits accrued on sales of materials to other subsidiary companies and on hand in latter's inventories			27,908,752.85
Total			$122,645,243.62

This surplus shows a handsome gain on that given in the report for 1906—$24,924,529.27.

Production.

The production of the several properties for the year, exclusive of that of the Tennessee Coal, Iron & Railroad Company, in comparison with the results for the fiscal year 1906, was as follows:

Products.	1907. Tons.	1906. Tons.
Iron ore mined:		
From Marquette Range	1,170,496	1,442,290
From Menominee Range	1,625,358	1,874,680
From Gogebic Range	1,425,457	1,465,375
From Vermilion Range	1,724,217	1,794,186
From Mesaba Range	16,458,273	14,068,617
Totals	22,403,801	20,645,148
Coke manufactured	12,373,938	13,295,075
Coal mined, not including that used in making coke	1,841,259	1,912,444
Limestone quarried	2,957,163	2,227,436
Blast furnace products:		
Pig iron	10,631,620	11,058,526
Spiegel	130,554	150,044
Ferromanganese and ferrosilicon	57,794	58,807
Totals	10,819,968	11,267,377

Products.	1907.—Tons.	1906.—Tons.
Steel ingot production:		
Bessemer ingots	7,556,460	8,072,655
Open hearth ingots	5,543,088	5,438,494
Totals	13,099,548	13,511,149
Rolled and other finished products for sale:		
Steel rails	1,733,814	1,982,042
Blooms, billets, slabs and sheet and tin plate bars	758,699	1,096,727
Plates	877,682	836,399
Heavy structural shapes	587,954	620,823
Merchant steel, skelp, hoops, bands and cotton ties	1,316,387	1,240,548
Tubing and piping	1,174,629	1,025,913
Rods	126,095	111,488
Wire and products of wire	1,481,226	1,399,717
Sheets—black, galvanized and tin plate	1,070,752	1,112,542
Finished structural work	719,887	643,622
Angle and splice bars and joints	195,157	176,730
Spikes, bolts, nuts and rivets	67,991	70,233
Axles	189,006	181,913
Sundry iron and steel products	77,463	79,736
Totals	10,376,742	10,578,433
Spelter	31,454	28,884
Copperas (sulphate of iron)	24,540	21,933
	Barrels.	Barrels.
Universal Portland cement	2,129,700	2,076,000

Capital Expenditures for Property and Construction.

The expenditures made during the year, and properly chargeable to capital account, for the acquisition of additional property and construction, less credits for property sold, but exclusive of the amount paid for the purchase of stock of the Tennessee Coal, Iron & Railroad Company, were as follows:

Expended by all companies, exclusive of amount of construction outlays by the Tennessee Company	$65,996,365.72
Expended by Tennessee Coal, Iron & Railroad Company during the months of November and December, 1907	984,886.74
Total	$66,981,252.46

The expenditures in 1907 include, as shown below, a large outlay for account of the Gary plant and the building of the city of Gary. All of the above expenditures comprehend only actual additions and extensions to the plants and properties. The capital expenditures are classified by property groups as follows:

Gary plant, the city of Gary and terminal railroad work adjacent thereto	$19,343,229.62
All other manufacturing properties except Tennessee Company	23,329,673.09
Tennessee Company	984,886.74
Coal and coke properties	4,093,283.65
Iron ore properties	5,854,797.07
Transportation properties	13,194,074.61
Miscellaneous properties	181,307.68
Total for the year 1907	$66,981,252.46
Amount expended for additional property and construction from April 1, 1901, to January 1, 1907	139,094,037.49
Making a grand total expended to January 1, 1908, of	$206,075,289.95

Inventories.

The book valuation of the inventories of all of the properties at December 31, 1907, aggregated $136,188,874, in comparison with a total at the close of the preceding year of $119,897,467, an increase of $16,291,407. This increase in the total figures is due in part to including this year the Tennessee Coal, Iron & Railroad Company's inventories, amounting to $2,507,804, but principally to the increased quantity of iron ore in stock. The tonnage of this commodity on hand at furnaces and lower lake docks was 27 per cent. greater than at December 31, 1906, while the average price at which it was inventoried is also somewhat higher than the price used at the close of the preceding year. The diminution in operations which began in November, 1907, resulted somewhat in adding to the tonnage of ore on hand, but it was the intention to have on hand a larger supply than usual. The diminution in operations above mentioned also accounts to some extent for the increased inventory of fuels, fluxes and refractories, manufacturing and operating supplies and finished products on hand.

Inventories were taken on the basis of actual purchase or production cost of materials to the respective companies holding the same, unless such cost was above the market value on December 31, 1907, in which case the market price was used. The aggregate inventory valuation of all raw, partly finished and finished materials produced within the organization is much below the market price on December 31, 1907. Inventory valuations do, however, include the profits on materials embraced in inventories which have been purchased by one subsidiary company from another; but, as shown by the general balance sheet, such profits are segregated and carried in a specific surplus account, and will not be included in the reported earnings of the entire organization until such profits shall have been converted into cash or a cash asset to the organization. The specific surplus account referred to is, therefore, practically a guarantee fund for these profits so locked up in inventories pending realization in cash.

The following is a general classification of the inventory valuations at December 31, 1907, in comparison with December 31, 1906:

	December 31, 1907.	December 31, 1906.
Ores	$58,984,718	$42,330,919
Pig iron, scrap, ferro and spiegel	6,417,224	7,071,656
Coal, coke and other fuel	2,697,728	1,610,161
Copper, nickel, aluminum and alloys	358,482	662,626
Pig tin, lead, zinc, spelter, dross and skimmings	3,146,385	5,958,744
Limestone, fluxes and refractories	2,243,268	1,455,996
Rolls, molds and stools	4,331,139	3,638,853
Manufacturing supplies, stores and sundry items	11,569,216	10,133,018
Ingots—steel and nickel	451,552	750,146
Blooms, billets, slabs, sheet and tin bars, &c.	6,416,619	5,785,217
Wire rods	709,060	714,517
Skelp	1,212,483	1,502,314
Finished products	24,868,713	21,626,657
Mining supplies and stores (for ore and coal properties)	3,101,742	2,793,688
Railroad supplies and stores	2,979,707	2,167,005
Merchandise of supply companies	797,115	762,154
Material, labor and expense locked up in bridge and structural contracts, less bills rendered on account	2,294,103	4,054,060
Stocks abroad and on consignment	1,806,138	1,380,890
Material in transit	1,803,482	5,498,844
Totals	$136,188,874	$119,897,467

General Balance Sheet.

The condensed general balance sheet, as of December 31, 1907, is as follows:

Assets.

Property account (properties owned and operated by the several companies):		
Balance of this account as of December 31, 1906	$1,378,185,605.07	
Additions during 1907 to foregoing balance	614,722.63	
Tennessee Coal, Iron & Railroad Company's properties:		
Cost of fixed property as acquired at November 1, 1907	$48,961,208.83	
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	$1,494,742,788.99	
Less charged off to the following accounts:		
Bond sinking funds	$572,500.00	
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Funds provided from surplus net income for payment of capital expenditures	53,949,799.46	
	59,202,720.49	
	$1,435,540,068.50	
Expenditures for stripping and development at mines, &c.:		
Balance at December 31, 1906	$5,722,340.61	
Net increase during the year 1907	4,575,041.26	
	10,297,381.87	
		$1,445,837,450.37

view of which is given in Fig. 1. This mill has two three-high stands and two two-high stands, and is designed to turn out rounds from 10 to 50 mm. (⅜ to 2 in.) diameter, squares from 9 to 50 mm. (⅜ to 2 in.), and flats from 10 x 12 mm. (⅜ x ½ in.) to 35 x 55 mm. (1⅜ to 2⅛ in.).

The engine, as shown in Fig. 2, is a heavy design especially fitted to meet the exacting demands of rolling mill work. Air furnace iron was used for the larger castings, such as the cylinders, flywheel and the heavy one-piece frame. A tongue and groove attachment for the cylinders to the sole plate assures perfect alignment, and at the same time obviates the expansion strains due to temperature changes. The use of double eccentrics affords a wide range in engine power, giving a cut-off variation up to three-quarter stroke.

The matter of automatic safety devices, always of great importance, has received particularly careful attention in this engine. To the usual flyball governor stop, which blocks the admission valve hooks should any part of the governor driving mechanism fail, is added a lever connection to a rolling cut-off valve in the main steam line. This valve will also be closed independently of the flyball governor, in case the belt should run off or break by the falling of the idler pulley on the governor belt drive, or by the action of a small shifting eccentric governor placed inside the governor belt pulley. This eccentric governor is set to operate at 5 per cent. above normal speed.

The four motor driven shears are intended for cutting 2 x 2 in. bars and ½ x 2 in. flats, together, and the cold draw bench is capable of exerting a pull of 40,000 lb.

The Mesta Machine Company, Pittsburgh, recently made shipment of a twin reversing engine to be directly connected to a roughing rail mill for the Tennessee Coal, Iron & Railroad Company, Ensley, Ala. The general dimensions of the engine are: Length over all, 50½ ft.; width, 29½ ft.; weight, 850,000 lb.; cylinders, 55 in. diameter by 66 in. stroke. The contract calls for operation with 150 lb. steam pressure and a speed of 150 rev. per min., under which conditions and a three-quarter cut-off the engine will develop 27,000 hp. In general, the engine is twin simple with piston valve gear, and, following the usual Mesta custom, shows a massive construction to stand the shocks and severe service encountered in reversing mill work.

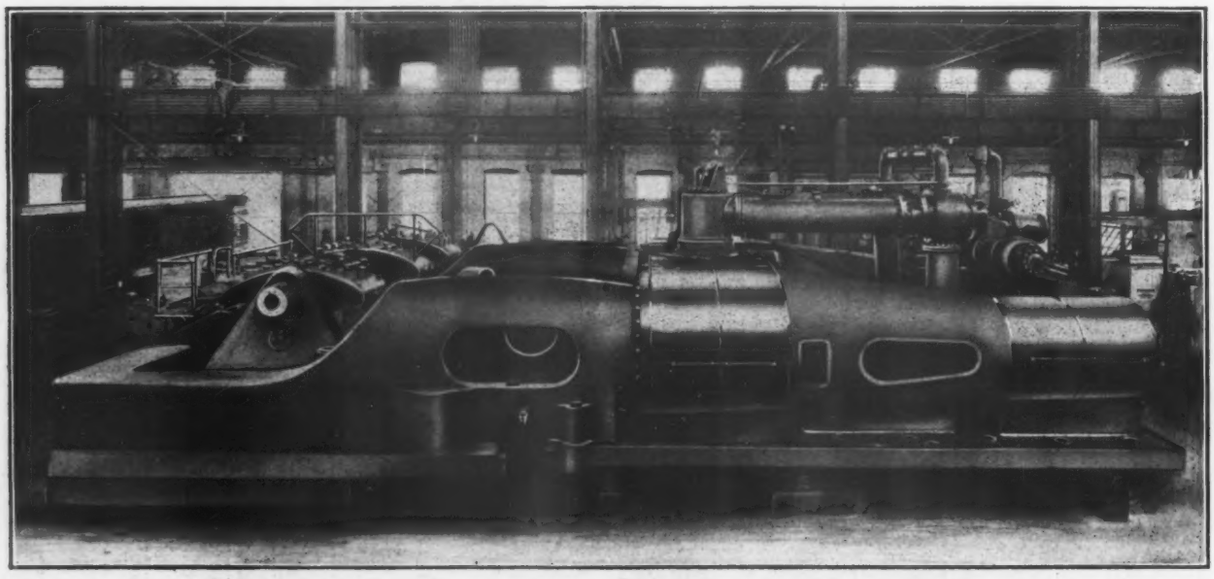
The Massillon Iron & Steel Company, Massillon, Ohio, engineer, founder and machinist, is making some large additions to its plant which will considerably increase its capacity.

The Largest Engine in the World.

The United States Steel Corporation has recently installed in the mills of the Carnegie Steel Company at South Sharon, Pa., the most powerful engine ever built. It has a capacity of 25,000 hp., or nearly double the size of its nearest rival, and was erected complete in the engine building shops of the Allis-Chalmers Company at West Allis, near Milwaukee, Wis.

Some idea of the size of this engine is afforded by the illustration, which shows it contrasted with a man of average hight. Two of the castings for it weighed, after machining, 118 tons each, requiring for their transportation the special reinforced 100-ton cars built in the Chicago, Milwaukee & St. Paul Railroad shops at Milwaukee for Allis-Chalmers Company for just such purposes as this. The engine as a whole weighs 550 tons without foundation plates or flywheel. It is a horizontal, twin tandem compound rolling mill engine, with cylinders 42 and 70 x 54 in. stroke, designed to operate condensing at 175 lb. steam pressure and a speed of 150 to 200 rev. per min.

Notwithstanding the enormous size of the engine and the tremendous power which it exerts, it is easily controlled and requires the services of only one engineer. Being used to operate the rolls in a steel mill, it has to be quickly reversed at the end of each run, and the load varies within a few moments from nothing to the maximum power exerted. The reversing mechanism used for changing the direction of the engine is of the Reynolds-Marshall type and is run by a small independent engine with oil cylinder lock. Another small engine is also employed in operating the steam throttle valves, all of these units being under the perfect control of the one engineer. No more than a few seconds' time is consumed in the reversing.

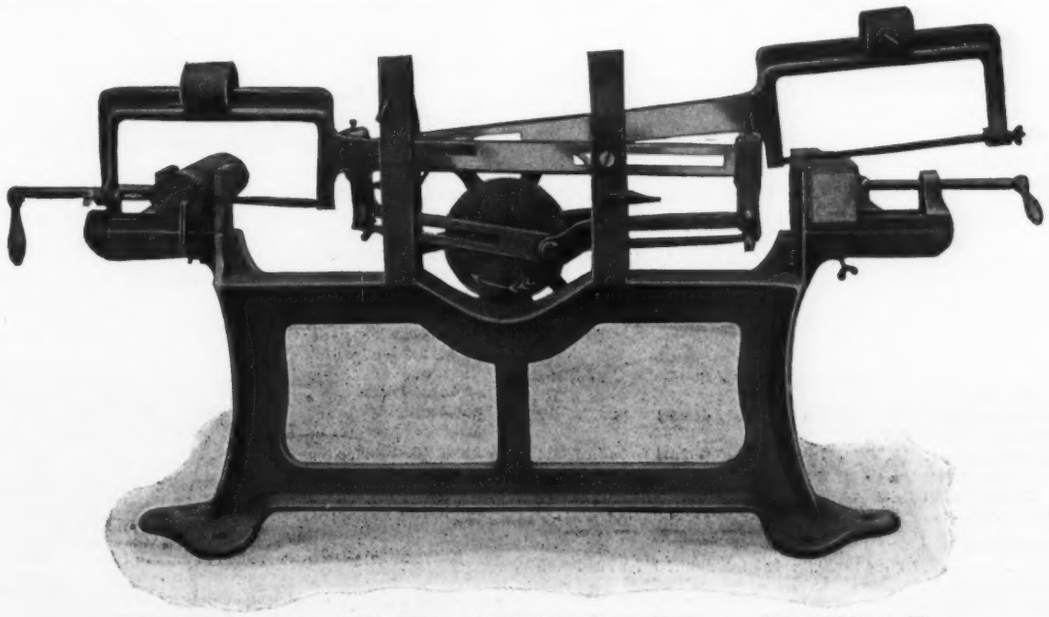


The 25,000-Hp. Allis-Chalmers Tandem-Compound Rolling Mill Engine for the Carnegie Steel Company, as It Appeared Partly Erected in the Builder's Shop.

Some years ago the work of installing a machine of this size would have required months, with considerable additional time spent in getting it ready for service, but this company has built so many huge engines of this class that its engineers and erecting men have acquired great facility in the work. An instance of it is the installation of an engine which preceded the 25,000-hp. unit above referred to. This was placed on its foundation and completely assembled within 10 days after arrival at the mill, notwithstanding that before the new engine could be erected an old one which had been kept in service until the last minute had to be torn out. Most remarkable of all is the fact that within 30 min. after the last bolt had been adjusted and steam admitted to the cylinders, the engine was doing its full work rolling rails, and remained continuously in operation thereafter.

The Ryerson Tandem Hack Saw.

A rather unusual type of power hack saw is the double tandem one illustrated, which is being offered by Joseph T. Ryerson & Son, Chicago. Besides effecting a saving in floor space and auxiliary equipment, it is designed to reduce the cost of maintenance, lubrication and attendance, which would attend the operation of two separate machines. As will be observed, both saws are mounted on a single frame, and are reciprocated by a single crank mounted on the pulley shaft at the center of the machine. The driving arms are carried in two upright guide yokes, which serve to keep the saws in alignment.



A Two-in-One Tandem Power Hack Saw Sold by Joseph T. Ryerson & Son, Chicago, Ill.

On the forward or cutting stroke a downward pressure is exerted, which results in faster cutting, and on the return stroke, when the saw is not cutting, the pressure is relieved by the lifting motion imparted to the arm. Each saw is fitted with an independent automatic stop, which engages the holding clamp at the end of the slotted driving arm and stops the saw when the cut is finished.

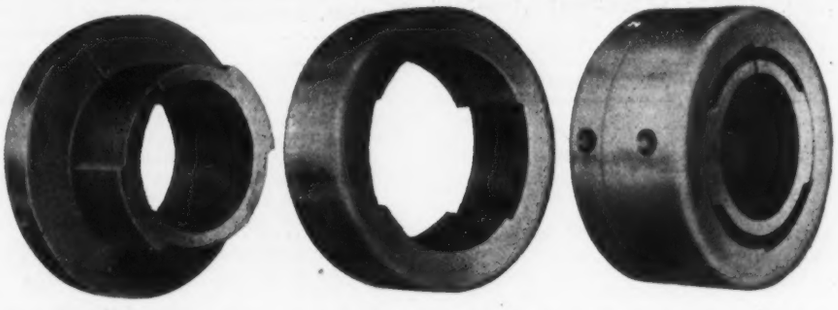
Vises with swivel jaws capable of adjustment to material of various shapes are provided; they are removable and are so fitted as to insure contact of the saw through the entire length of the blade. The machine occupies a floor space of 12 x 48 in., weighs 260 lb., and carries a pulley 14 in. in diameter by 3-in. face, which should run at a speed of from 65 to 75 rev. per min.

Twenty-three of the district managers of the Westinghouse Electric & Mfg. Company concluded last week a meeting at East Pittsburgh. They were summoned together to report on conditions in the various fields, such meetings being held annually. As to the business outlook, the managers were divided in opinion, those from the West predicting that the trade record for this year would be as good as that of 1907, and the Eastern managers saying they expected a decrease. All were united, however, in the belief that business has begun to pick up all over the country. It was concluded, after all reports were heard, that the electrical business for 1908, compared with that of 1907, will not show as great a loss as has been anticipated.

The Murchie Safety Clamp Collar.

That the projecting heads of set screws in shaft couplings and other revolving parts are a menace is so well known that any device to eliminate them is of timely interest. What is designated by the patentee and maker, S. T. Murchie, Kaukauna, Wis., as a safety clamp collar, is represented to combine the desired features of safety, simplicity and ease of application, together with practical efficiency. The coupling is shown in the accompanying illustration assembled and disassembled.

It consists of two parts, composed of the collar proper and a binder ring, both of which are of steel. The former is made with a projecting sleeve, carrying two slightly tapered bosses on its outer surface opposite to each other, and is split longitudinally on one side. Grooved ways are cut on the inside of the compression ring corresponding in position to the collar bosses. When in position the ring is slipped on the collar, and set up to the shoulder, the wedge taper of the bosses being sufficient to compress the collar and cause it to firmly grip the shaft.



A Clamping Collar or Shaft Coupling Devoid of Dangerous Projecting Parts, Made by S. T. Murchie, Kaukauna, Wis.

Held solely by a friction clutch thus applied there are no set screws in this coupling to mar the shafting or catch the clothing of employees or others. It is, moreover, easily adjusted and removed, and avoids as far as practicable the preventable accidents occasioned by the old style collar with protruding set screws. This clamp coupling is furnished in sizes to fit all shafting of ordinary diameters.

The United States Steel Corporation's Annual Report.

Gross Sales and Earnings $757,014,767.68. Increase Over Best Previous Year $60,257,876.67.

Net Earnings $160,964,673.72. Increase Over Best Previous Year $4,340,400.54.

The sixth annual report of the United States Steel Corporation, covering the operations of the fiscal year ending December 31, 1907, shows that its gross sales and earnings far surpassed those of any previous year. The business thus transacted totaled the stupendous sum of $757,014,767.68, which was $60,257,876.67 in excess of the amount reached in 1906, when a new record was made. The net earnings were $160,964,673.72, exceeding those of the previous year by $4,340,400.54. The report, which includes operating results of the Tennessee Coal, Iron & Railroad Company, for November and December, enables the following comparisons to be made.

Income Account.

	1907. $	1906. $	Increase. $
Earnings	160,964,673.72	156,624,273.18	4,340,400.54
Less appropriations for the following purposes:			
Sinking funds on bonds of subsidiary companies	1,977,761.03	1,904,063.50	73,697.53
Depreciation and extinguishment funds	6,681,746.03	5,857,410.91	824,335.12
Extraordinary replacement funds	15,560,237.38	15,395,860.64	164,376.74
Special replacement and improvement funds	3,500,000.00	7,500,000.00	*4,000,000.00
Net earnings in the year	133,244,929.28	125,966,938.13	7,277,991.15
Deduct interest on U. S. Steel Corporation bonds outstanding	22,860,352.82	22,839,849.98	20,502.84
Sinking funds on U. S. Steel Corporation bonds—viz.:			
Installments	4,050,000.00	4,050,000.00	.....
Interest on bonds in sinking funds	1,087,497.18	858,000.02	229,497.16
	105,247,079.28	98,219,088.13	7,027,991.15
Less charged off for various accounts and adjustments	681,515.52	90,501.19	591,014.33
Balance	104,565,563.76	98,128,586.94	6,436,976.82
Less dividends on preferred stock, 7 %	25,219,677.00	25,219,677.00	.....
Dividends on common stock, 2 %	10,166,050.00	10,166,050.00	.....
Surplus net income for the year	69,179,836.76	62,742,859.94	6,436,976.82
Appropriated from surplus net income for the following purposes:			
Account expenditures on authorized appropriations for additional property, new plants and construction, and for discharge of capital obligations	35,500,000.00	28,500,000.00	7,000,000.00
Set aside for construction of plant at Gary, Ind.	18,500,000.00	21,500,000.00	*3,000,000.00
Balance of surplus for the year	15,179,836.76	12,742,859.94	2,436,976.82

* Decrease.

Employees and Pay Rolls.

The average number of employees in the service of all companies during the fiscal year 1907, in comparison with the fiscal year 1906, was as follows:

	1907.	1906.
Manufacturing properties	151,670	147,048
Coal and coke properties	21,447	21,929
Iron ore mining properties	16,462	14,393
Transportation properties	18,133	16,638
Miscellaneous properties	2,468	2,449
Totals	210,180	202,457
Total annual salaries and wages	$160,825,822	$147,765,540

On January 1, 1907 (on March 1, 1907, in case of the coke companies), an advance was made in the wages and salaries of approximately 65 per cent. of the total employees of all companies. This advance increased the wages and salaries of the employees affected about 6 6-10 per cent. The average rate of wages and salaries paid all employees during 1907 was above 5 per cent. higher than the similar average rate in the next preceding year.

Statement of Surplus.

The net profits and surplus of the corporation and its subsidiary companies since April 1, 1901, are given as follows:

Capital surplus provided at date of organization			$25,000,000.00
Aggregate quarterly net profits		$515,303,938.08	
Less amount included therein representing accrued profits on inter-company materials on hand in inventories	$10,371,803.25		
Charges against profits made at close of fiscal years, not applicable to particular quarters	7,513,699.74		
Reserve to cover possible failure to realize advanced mining royalties	2,500,000.00		
		20,385,502.99	
Balance of profits earned			494,918,435.09
			$519,918,435.09
Dividends paid on U. S. Steel stock:			
Preferred, 47¼ per cent.		$193,755,597.66	
Common, 13½ per cent.		68,598,982.50	
			262,354,580.16
Leaving a surplus of			$257,563,854.93
Of the foregoing surplus the following amounts have been appropriated for the purposes named:			
For payment of construction and capital expenditures and special charges per fifth annual report.		$108,827,364.16	
For payment of construction and capital expenditures and for reserve for contemplated appropriations, per income account for 1907		54,000,000.00	
			162,827,364.16
Balance of surplus, December 31, 1907, exclusive of subsidiary companies' inter-company profits in inventories			$94,736,490.77
Undivided surplus of subsidiary companies on December 31, 1907, representing profits accrued on sales of materials to other subsidiary companies and on hand in latter's inventories			27,908,752.85
Total			$122,645,243.62

This surplus shows a handsome gain on that given in the report for 1906—$24,924,529.27.

Production.

The production of the several properties for the year, exclusive of that of the Tennessee Coal, Iron & Railroad Company, in comparison with the results for the fiscal year 1906, was as follows:

Products.	1907. Tons.	1906. Tons.
Iron ore mined:		
From Marquette Range	1,170,496	1,442,290
From Menominee Range	1,625,358	1,874,680
From Gogebic Range	1,425,457	1,465,375
From Vermilion Range	1,724,217	1,794,186
From Mesaba Range	16,458,273	14,068,617
Totals	22,403,801	20,645,148
Coke manufactured	12,373,938	13,295,075
Coal mined, not including that used in making coke	1,841,259	1,912,444
Limestone quarried	2,957,163	2,227,436
Blast furnace products:		
Pig iron	10,631,620	11,058,526
Spiegel	130,554	150,044
Ferromanganese and ferrosilicon	57,794	58,807
Totals	10,819,968	11,267,377

Products.	1907.—Tons.	1906.—Tons.
Steel ingot production:		
Bessemer ingots	7,556,460	8,072,655
Open hearth ingots	5,543,088	5,438,494
Totals	13,099,548	13,511,149
Rolled and other finished products for sale:		
Steel rails	1,733,814	1,982,042
Blooms, billets, slabs and sheet and tin plate bars	758,699	1,096,727
Plates	877,682	836,399
Heavy structural shapes	587,954	620,823
Merchant steel, skelp, hoops, bands and cotton ties	1,316,387	1,240,548
Tubing and piping	1,174,629	1,025,913
Rods	126,095	111,488
Wire and products of wire	1,481,226	1,399,717
Sheets—black, galvanized and tin plate	1,070,752	1,112,542
Finished structural work	719,887	643,622
Angle and splice bars and joints	195,157	176,730
Spikes, bolts, nuts and rivets	67,991	70,233
Axles	189,006	181,913
Sundry iron and steel products	77,463	79,736
Totals	10,376,742	10,578,433
Spelter	31,454	28,884
Copperas (sulphate of iron)	24,540	21,933
	Barrels.	Barrels.
Universal Portland cement	2,129,700	2,076,000

Capital Expenditures for Property and Construction.

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Copper, nickel, aluminum and alloys	358,482	662,626
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Limestone, fluxes and refractories	2,243,268	1,455,996
Rolls, molds and stools	4,331,139	3,638,855
Manufacturing supplies, stores and sundry items	11,569,216	10,133,018
Ingots—steel and nickel	451,552	750,146
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Material in transit	1,803,482	5,498,844
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Expended for construction in November and December	984,886.74	
		49,946,095.57
Expended for additional property and construction in 1907 other than by or for account T. C., I. & R. R. Co.		65,996,365.72
		$1,494,742,788.99
Less charged off to the following accounts:		
Bond sinking funds	$572,500.00	
Depreciation, extinguishment and replacement funds	4,680,421.03	
Funds provided from surplus net income for payment of capital expenditures	53,949,799.46	
		59,202,720.49
		$1,435,540,068.50
Expenditures for stripping and development at mines, &c.:		
Balance at December 31, 1906	$5,722,340.61	
Net increase during the year 1907	4,575,041.26	
		10,297,381.87
		$1,445,837,450.37

Deferred charges to operations:		
Payments for advanced mining royalties, exploration expenses and miscellaneous charges, chargeable to future operations	$6,204,733.85	
Less fund reserved from surplus to cover possible failure to realize advanced mining royalties	2,500,000.00	3,704,733.85
Investments:		
Outside real estate and other property		1,717,119.87
Sinking and reserve fund assets:		
Cash held by trustees, account of bond sinking funds ($31,559,000 par value of redeemed bonds, held by trustees, not treated as an asset.)	$444,200.88	
Contingent fund and miscellaneous assets	1,215,522.85	
Insurance fund assets (at market value)	4,120,158.63	
Depreciation and extinguishment fund assets (at market value)	10,741,977.19	
Investments (at market value) for special construction fund for Gary plant	15,920,542.14	32,442,401.69
Current assets:		
Inventories*	$136,188,874.28	
Accounts receivable	58,398,454.36	
Bills receivable, customers' and guaranteed loans	10,193,706.91	
Agents' balances	835,269.33	
Sundry marketable bonds and stocks	8,831,154.32	
Loans on collateral	6,000,000.00	
Cash in hand and on deposit subject to check $51,222,395.07		
Deposits loaned on call 2,741,453.81		
	53,963,848.88	274,411,308.08
Grand total		$1,758,113,013.86
Liabilities.		
Common stock	$508,302,500.00	
Preferred stock	360,281,100.00	$868,583,600.00
Stocks of subsidiary companies not held by United States Steel Corporation (par value)		761,810.00
Bonded and debenture debt:		
United States Steel Corporation 50-year 5 per cent bonds	$303,957,000.00	
United States Steel Corporation 10-60-year 5 per cent. bonds	200,000,000.00	
Total	$503,957,000.00	
Less redeemed and held by trustees of sinking funds	23,758,000.00	
Balance outstanding	$480,199,000.00	
Subsidiary companies' bonds (guaranteed by United States Steel Corporation)	$48,036,000.00	
Subsidiary companies' bonds (not guaranteed by United States Steel Corporation)	79,716,904.13	
Total	$127,752,904.13	
Less redeemed and held by trustees of sinking funds	7,801,000.00	
Balance outstanding	119,951,904.13	
Debenture scrip, Illinois Steel Company	34,366.66	600,185,270.79
Mortgages and purchase money obligations of subsidiary companies:		
Mortgages	$2,135,240.38	
Purchase money obligations	3,258,700.65	5,393,941.03

* Inventory valuations include profits accrued to subsidiary companies on materials and products sold to other subsidiary companies and undisposed of by the latter—see contra specific surplus account for these profits. The total of all inventories is, however, below the actual current market prices.

Current liabilities:		
Current accounts payable and payrolls	$22,506,488.45	
Bills payable (of Tennessee Coal, Iron & Railroad Company)	1,052,747.59	
Special deposits or loans due employees and others	1,057,495.58	
Accrued taxes not yet due	3,736,747.80	
Accrued interest and unpresented coupons	7,863,913.57	
Preferred stock dividend No. 27, payable February 29, 1908	6,304,919.25	
Common stock dividend No. 17, payable March 30, 1908	2,541,512.50	45,063,824.74
Total capital and current liabilities		$1,519,988,446.56
Sinking and reserve funds:		
Sinking, depreciation and replacement funds	$41,360,655.19	
General construction fund for authorized appropriations	3,923,814.96	
Special construction fund for Gary plant	26,051,242.62	
Contingent and miscellaneous operating funds	7,991,275.89	
Insurance funds	4,648,358.57	83,975,347.23
Bond sinking funds with accretions		31,503,976.45
Represented by cash (and by redeemed bonds not treated as assets).		
Undivided surplus of United States Steel Corporation and subsidiary companies:		
Capital surplus provided in organization	$25,000,000.00	
Balance of surplus accumulated by all companies from April 1, 1901, to December 31, 1907	69,736,490.77	
Total surplus exclusive of subsidiary companies' inter-company profits in inventories	$94,736,490.77	
Undivided surplus of subsidiary companies, representing profits accrued on sale of materials and products to other subsidiary companies and on hand in latter's inventories	27,908,752.85	122,645,243.62
Grand total		$1,758,113,013.86

General Profit and Loss Account.

The condensed general profit and loss account for the year ending December 31, 1907, is as follows:

Gross receipts—Gross sales and earnings		$757,014,767.68
Less manufacturing and producing cost and operating expenses		*564,166,777.12
Balance		$192,847,990.56
Sundry net manufacturing and operating gains and losses, including idle plant expenses, royalties received, depreciation in inventory valuations, &c	$2,567,150.85	
Rentals received	699,058.60	3,266,209.45
Total net manufacturing, producing and operating income		$196,114,200.01
Net profits of properties owned, including those of the Tennessee Coal, Iron & Railroad Company for two months, but whose operations (gross revenue, cost of product, expenses, &c.) are not included in this statement.	$1,737,939.35	
Interest and dividends on investments and on deposits, &c	4,744,801.62	6,482,740.97
Total income		$202,596,940.98
Administrative, selling and general expenses, and employees' bonus and pension funds (not including general expenses of transportation companies)	$15,945,436.84	
Taxes	5,383,923.95	
Miscellaneous expenditures and charges (net)	114,008.89	
Commercial discounts and interest	3,952,009.65	25,395,379.33
Balance of income		$177,201,561.65
Interest on bonds and mortgages of the subsidiary companies	$6,368,163.50	
Interest on purchase money obligations and special deposits or loans of the subsidiary companies	124,031.92	6,492,195.42
Balance, being the aggregate earnings of the several companies for the year		$170,709,366.23

* Includes charges for ordinary maintenance and repairs, approximately $35,000,000.

Less profits earned by subsidiary companies on sales made and service rendered account of materials on hand in purchasing companies' inventories, and which profits have not yet been realized in cash from the standpoint of a combined statement of the business of the United States Steel Corporation and subsidiary companies	9,744,692.51
Earnings for the year 1907	$160,964,673.72

Earnings by Months and Quarters.

Following is a table showing earnings by months and quarters from January 1, 1905, to December 31, 1907:

Month.	1905. $	1906. $	1907. $
January	6,810,846.88	11,856,375.42	12,838,703.25
February	6,629,462.87	10,958,275.20	12,145,814.95
March	9,585,585.87	13,819,839.50	14,137,973.85
First quarter	23,025,895.62	36,634,490.12	39,122,492.05
April	9,037,924.69	12,581,901.80	14,600,837.97
May	10,602,187.27	14,041,601.28	16,056,832.06
June	10,665,004.46	13,501,529.84	14,846,034.82
Second quarter	30,305,116.42	40,125,032.92	45,503,704.85
July	9,035,168.49	12,242,098.07	13,804,167.34
August	10,986,901.02	13,158,860.10	15,279,172.67
September	11,218,513.43	12,713,666.08	14,720,945.15
Third quarter	31,240,582.94	38,114,624.25	43,804,285.16
October	12,400,306.52	14,984,925.75	17,052,210.70
November	11,827,214.98	13,482,464.58	10,467,252.60
December	10,988,541.95	13,282,735.56	5,014,728.36
Fourth quarter	35,216,063.45	41,750,125.89	32,534,191.66
Total for year	119,787,658.43	156,624,273.18	160,964,673.72

Maintenance, Renewals and Extraordinary Replacements.

The expenditures made by all companies during the year 1907 for maintenance and renewals, including the relining of blast furnaces, and for extraordinary replacements, equaled the total sum of $55,828,253.12, an increase in comparison with the expenditures for the same purposes during the preceding year of $7,495,163.75, or 15.5 per cent. The expenditures in the year 1907 were the largest of any year in the organization's history. The annual expenditures since 1902 have been as follows:

1902	$29,157,010.73	1906	$48,333,089.37
1903	34,785,191.21	1907	55,828,253.12
1904	26,258,372.22		
1905	37,471,769.63	Total	$231,833,686.28

The entire amount of the foregoing expenditures was charged to current operating expenses and to replacement funds reserved from earnings.

Special Construction Fund for the Gary Plant.

There have been specifically set aside from surplus net income for account of this fund amounts as follows:

Advances have been made from this fund to cover expenditures for the acquirement of real estate and construction work at the Gary plant, the building of the city of Gary, and terminal railroad work adjacent thereto, as follows:		
1906	$4,632,202.11	
1907	19,316,555.27	
		23,948,757.38
Leaving a balance unexpended December 31, 1907, of		$26,051,242.62
1905		$10,000,000.00
1906		21,500,000.00
1907		18,500,000.00
Aggregate		$50,000,000.00

Of the unexpended balance reserved as above, $15,920,542.14 had been specifically invested prior to December 31, 1907, in salable securities, pending the actual requirement of the money. The balance of the fund is in the cash assets of the organization.

Acquisition of the Tennessee Coal, Iron & Railroad Company.

In and since November, 1907, the corporation acquired $30,374,825, par value, of the common stock and of common stock subscription receipts of the Tennessee Coal, Iron & Railroad Company, being all but $220,160 of the total of said common stock and common stock subscription receipts issued and outstanding at December 31, 1907. Of the foregoing aggregate of common stock and common stock subscription receipts acquired $29,742,170 was purchased at par, the corporation delivering in payment therefor its 10-60 year 5 per cent. sinking fund gold bonds, as the equivalent of cash, at the rate of $11,904.76, par value, of said bonds, for $10,000, par value, of Tennessee common stock; the balance of $632,655 of said stock acquired was paid for in cash, being the installment of 20 per cent. payable December 15, 1907, on the common stock subscription receipts. The total cost to the corporation of the stock acquired as above was as follows:

	Stock acquired.	Bonds delivered in payment.	Par of bonds issued and cost of bonds purchased; also cash paid.
For full paid common stock certificates	$29,109,515	$34,654,000	$33,949,282.48
For common stock subscription receipts, 20 per cent. paid	632,655	753,000	735,695.16
Total paid for with bonds	$29,742,170	$35,407,000	$34,684,977.64
For 20 per cent. installment paid December 15, 1907, on subscription receipts	632,655	.....	(Cash) 632,655.00
Total acquired and its cost	$30,374,825	$35,407,000	$35,317,632.64

Of the bonds delivered as above $30,000,000 were bonds held in the corporation's treasury, which had been executed and certified in 1903, as authorized by the directors and stockholders. The balance of the bonds delivered was acquired by the corporation through purchase in the open market.

During the year 1907 the production of the mineral and manufacturing properties of the Tennessee Company was as follows:

	Gross tons.
Iron ore	1,576,757
Limestone and dolomite	244,059
Pig iron for market	315,573
Pig iron for conversion at steel works	287,254
Total pig iron	602,827
Open hearth steel ingots	243,444
Steel rails	146,171
Billets, plates and bars	88,009
	Net tons.
Coal (not including that used in making coke)	1,709,251
Coke	1,170,826

The net profits of the Tennessee Company for the year 1907, after charging off $437,666.84 for depreciation and extraordinary replacements, and $885,552.31 for net interest charge on bonded and floating debt, were $1,426,684.58.

Extensive outlays were made during the year for construction and improvement work. The total amount expended aggregated $6,589,116.99. The outlays covered additions and betterments as follows:

Land and real estate account	$71,936.41
Extensions and betterments at ore and coal properties	1,259,017.77
Improvements at Bessemer rolling mills	4,592.87
Additions, extensions and betterments at Ensley furnaces, steel works and rolling mills	5,253,569.94
Total	$6,589,116.99

Employees' Subscriptions to Preferred Stock.

In January, 1908, there was again offered to the employees of the United States Steel Corporation and of the subsidiary companies the privilege of subscribing for 25,000 shares of preferred stock on substantially the same conditions as offered previously, except the price was fixed at $87.50 per share. The offer was oversubscribed by about 100 per cent., applications having been received from 24,884 employees for an aggregate of 50,075 shares. Allotments were made as follows: Each subscriber for one share was allotted the same, and all others were allotted 50 per cent. of their subscriptions. The total number of shares allotted on this basis was 30,621.

General Statement to Stockholders by Chairman Gary and President Corey.

During the first 10 months in the year 1907 the several departments of the subsidiary companies were operated at substantially their maximum capacity. The production by the manufacturing properties of finished prod-

ucts for sale during the period from January 1 to November 1, 1907, showed an increase of 5 per cent. over the corresponding period in 1906. Owing, however, to the sudden and severe check to general trade conditions which took place in the fall of 1907, the volume of business of the subsidiary companies was materially curtailed, resulting during the last two months of the year in a decrease in production of finished products which exceeded the gain made during the preceding 10 months. The production of finished steel products for sale in the entire year of 1907 shows a decrease compared with 1906 of 201,691 tons, or about 2 per cent. The decrease in actual shipments of products made to customers showed a somewhat larger falling off, 10,451,488 tons of all kinds of manufactured materials (including furnace products and scrap) having been shipped in 1907 against 10,862,425 tons in the preceding year. Prices of steel commodities for domestic sale were not generally advanced during the year notwithstanding there were marked increases in the cost of raw materials and supplies used in manufacturing, in railroad freight charges, in wages and in taxation charges.

EXPORTS.

The satisfactory results obtained from the export business, through the building up of a permanent and continuous export trade, as noted in previous reports, have continued. During the year there were shipped for export 1,014,082 tons of steel commodities of various kinds, a decrease of 6 per cent. as compared with the shipments in the previous year. The gross receipts for the 1907 shipments, however, exceeded those for 1906 by 16 per cent. The average mill price per ton received for all exported materials was only 7½ per cent. less than the average price received for all domestic shipments. The advantages to the employees, the domestic consumer and the manufacturer, of a fair volume of foreign trade during periods of business depression in the United States, have been emphasized in previous reports. In order to obtain the maximum benefits from such trade during times of lesser activity in business in the domestic market, it seems wise to sell continuously in the neutral markets of the world and even at times when foreign trade conditions do not result in prices so near the domestic prices as were received during 1907.

THE TENNESSEE PURCHASE.

In November, 1907, the corporation acquired a majority of the common stock of the Tennessee Coal, Iron & Railroad Company. The purchase was made during the financial panic of October, 1907. The parties owning or controlling a majority of the Tennessee Company's stock offered it to the corporation on terms which were satisfactory, both as to price and manner of payment. The purchase of the property promises benefit to the corporation and also aided promptly and materially in relieving the financial stress at the time existing. The Tennessee property is very valuable. Its mineral resources are large. The location of the iron ore and coal deposits in the immediate proximitiy of the manufacturing plants enables the production of iron at reasonable cost. It is believed the lines of business of the Tennessee Company can be materially extended. During the last two years about $6,250,000 was expended in rehabilitating, modernizing and enlarging the furnaces and steel plant. Additional expenditures of considerable magnitude in 1908 are contemplated to complete the plans for improvements which were under way when the corporation acquired the property. It is believed that when these improvements and extensions shall have been completed and the operating management perfected the business of the company will be profitable.

The expenditures by subsidiary companies during 1907 for additional property and construction, including the Tennessee Company's expenditures for two months only, amounted to $66,981,252.46. Included in this total is $19,343,229.62 for account of the Gary plant in Indiana. The subsidiary companies also made during the year expenditures aggregating $20,324,584.90 for extraordinary replacements. The properties have been maintained at the highest state of efficiency, and through liberal outlays their production and earning power have been materially increased. At the close of the year a large amount of construction and improvement work was still in progress, being principally the uncompleted portion of the programme for extensions and betterments authorized in the early part of 1907. The amount unexpended at January 1, 1908, for these purposes, including those for Tennessee Coal, Iron & Railroad Company, but exclusive of the requirements for the new work at Gary, equaled approximately $40,000,000. It is estimated that about 85 per cent. of this total amount can be expended in 1908.

THE GARY PLANT.

Substantial progress was made during the year in the construction of the new plant at Gary. The expenditures made in connection with it to December 31, 1907, including the cost of about 9000 acres of land, amounted to $24,063,388.53. This amount has been provided entirely from surplus net profits of the corporation. At December 31, 1907, there was reserved in the special fund set aside and available for this work, a balance of $26,051,242.62. The balance unexpended at January 1, 1908, on appropriations heretofore authorized, was $35,517,000. It is believed about $18,000,000 of this amount can be expended during 1908. The following is a brief description at December 31, 1907, of the property and the status of the coastruction work at Gary:

The property is located at the southern end of Lake Michigan, in Lake County, Indiana, 25 miles from the business center of Chicago, Illinois. The tract contains about 9000 acres, with about 10 miles frontage on the shore of Lake Michigan, and the area will ultimately be increased by filling the present submerged lands adjoining the Lake Michigan shore line. The property is located on, or immediately adjacent to, five trunk lines of railroads.

The steel plant is being constructed on an area of 1000 acres of the above property fronting on the lake. Ground was first broken in August, 1906. The plant construction authorized to date is as follows:

Eight 450-ton per day blast furnaces, with the necessary vessel slip, ore unloading and storing facilities, power houses, pig casting plant and other auxiliaries; 56 60-ton open hearth furnaces, estimated to produce 225,000 tons of ingots per month; rail mill, estimated to produce 100,000 tons of rails per month; billet mill, estimated to produce 100,000 tons of billets per month; 48-in. universal plate mill; 160-in. sheared plate mill; merchant mills, with a capacity of 50,000 tons per month; complete equipment of mechanical shops; office building.

The general plans adopted provide various departments in this plant, which will permit increasing the number of blast furnaces to 16, and the steel producing and rolling capacity accordingly.

The progress made in the construction work to date is as follows:

The vessel slip, which is 250 ft. wide and is to extend inland 3000 ft. and from the shore line into the lake 2000 ft., has been excavated to approximately 2500 ft. inland; the two docks forming the sides of the slip extending into the lake are well under way, the piling and sheeting having been placed for nearly the entire distance.

The ore unloaders are erected complete, and the ore bridges and bins are in process of erection.

The ironwork on four blast furnaces is nearing completion, and the foundations for the second four are ready to receive the ironwork.

The blowing engines for the first four furnaces, comprehending eight gas driven and two steam driven engines, are under process of erection. The foundations have been started for the blowing engines for the second four furnaces.

The electric power plant, which is to furnish power for driving all of the mills in the plant, also for pumping water and for lighting the city of Gary, includes a power house 969 ft. long by 107 ft. wide, one-half of which is now erected, together with the foundations for nine gas engines and two steam turbines. The foundations for the remainder of the building and machinery are well under way. There will be installed in this plant in all 17 3000 hp. gas driven generators and two 2500 hp. steam turbine driven generators. It is believed this is the largest installation in one unit of gas engines that has ever been made.

In the steel producing department, one open hearth unit, consisting of 14 60-ton furnaces, with hot metal mixer and other auxiliaries, is nearing completion, and the foundations for the second similar unit are completed and erection of the steelwork has been started.

On the rail mill the foundations and the building are nearing completion, and the erection of the machinery is well advanced.

On the billet mill a part of the excavation and foundation work has been completed. Seventy-five per cent. of the machinery for this mill has been contracted for, and is now being constructed.

For the plate mills and merchant mills the plans have been completed.

The shop equipment, including machine shop, boiler shop, foundry, blacksmith shop, carpenter and pattern shop, pattern storage shop, roll shop and general store building, is practically completed and in operation.

The office building has been completed.

THE CITY OF GARY.

Approximately 800 acres of the property acquired, lying immediately south of the mill site and separated from it by the Grand Calumet River, has been platted into about 4000 lots and incorporated as the first subdivision of the city of Gary. This subdivision will contain more than 25 miles of paved and macadamized streets. To date 25,250 lineal feet of streets have been paved, and 37,000 lineal feet of sidewalks laid.

A sewer system, consisting of a discharge main 96 in. in diameter, with lateral branches 60, 54 and 36 in., respectively in diameter, has been installed, having a total length of 97,000 lineal feet.

Ninety-one thousand lineal feet of water pipe has been laid in the first subdivision and temporary pumps installed, which are now furnishing the water supply from driven wells. There is under construction a permanent water works pumping station, which contemplates the construction of a water tunnel 72 in. in diameter, 15,000 ft. long, extending into the lake 7000 ft. from the present shore line.

A gas plant, with a capacity of 300,000 cu. ft. of water gas per day, is completed and in operation. Seventy-one thousand lineal feet of gas pipe has been laid in the first subdivision.

An electric lighting plant, furnishing both incandescent and arc lights, has been installed and is in operation, current being furnished temporarily from lines connecting with the Illinois Steel Company's electric generating plant at South Chicago.

Approximately 500 dwelling houses have been erected. Many of these houses are now occupied. In addition to the dwelling houses, the following public buildings have been erected and are now occupied: One hotel building, containing 40 rooms; one restaurant; two lodging houses; schoolhouse, containing nine rooms.

All of the above development and construction work in the city of Gary has been carried on by the Gary Land Company, a subsidiary company of this corporation.

Residence and business lots have been offered for sale, with the requirement that buildings of an approved character be erected thereon within 18 months after purchase. Under this plan approximately 240 lots have been sold, largely in the business districts. On the principal business street in the first subdivision there have been constructed by purchasers of lots about 40 business blocks, the estimated cost of which is $600,000 or more. Most of these buildings have been completed and are now occupied by stores of various kinds, two banks and offices.

TERMINAL RAILROAD WORK.

The main lines of the Baltimore & Ohio Railroad Company and the Indiana Harbor Railroad Company ran directly through the manufacturing mill site. In order to remove these lines of railroad from the mill site and to permit the construction of a sufficiently large and properly located railroad yard for use in connection with the steel plant, an agreement was entered into by the various railroad companies concerned whereby the main lines of the Baltimore & Ohio Railroad Company and the Indiana Harbor Railroad Company were changed so as to run south of the mill site. This changing of the main lines of the companies named also involved a change in the main line of the Lake Shore & Michigan Southern Railway Company and the construction of a new line of railroad from a connection with the Indiana Harbor Railroad east of the mill site, southwesterly and westerly, passing to the south of the city of Gary, to the town of Gibson, where a connection is again made with the Indiana Harbor Railroad.

A great deal of clearing, grading and filling, and track laying has been done in connection with the foregoing rearrangement and construction of railroad lines. Upon the completion of the work an adjustment of the expenditures is to be made between all of the companies interested.

Within the steel plant of the Indiana Steel Company 41.6 miles of standard gauge yard tracks have been laid. Outside of and adjacent to the steel plant to the westward the large railroad yard known as Kirk Yard is under construction by a subsidiary company. In this work approximately 21 miles of tracks have already been laid and additional grading done to take care of necessary additional tracks for some time to come. At the eastern end of this yard substantial progress has been made in the construction of a large roundhouse, coal chutes and power house.

THE MINNESOTA STEEL COMPANY.

There has been purchased a site containing about 1580 acres (of which 300 acres are now submerged) located in St. Louis County, Minnesota, 10 miles from the center of the city of Duluth, on which it is proposed to construct a moderate sized iron and steel plant. The tract fronts on the St. Louis River, which is navigable for large lake steamers, and is located on the line of the Northern Pacific Railway. It is expected, however, that there will be constructed in connection with the steel plant a belt railroad extending northwardly therefrom to a connection with the Duluth, Missabe & Northern Railway, to enable the prompt and economical delivery of ore to the plant from the Minnesota ore ranges; also eastwardly from the steel plant across the St. Louis River into Superior, Wis., where connections will be made with five trunk lines of railroads reaching the head of Lake Superior from the south and west. It is proposed to have the plant constructed by the Minnesota Steel Company, a subsidiary corporation. The plans for the scope and construction of the steel plant have not yet been fully developed. The expenditures on account of this property during 1907 include the purchase of the real estate and some clearing and leveling of the site.

PENSION FUND.

Reference was made in the last annual report to the proposal to establish from the employees' bonus fund for 1907 a separate fund to be used for pension purposes. Accordingly there was reserved for this purpose the sum of $1,600,000. The plan under which the benefits accruing from this pension fund will be extended to employees is under consideration.

ORDERS INCREASING.

During the first six months of 1907 orders for steel products were received equaling substantially the maximum capacity of the mills. Subsequently there was a marked falling off in the new business offered. As a result the tonnage of unfilled orders on the books at December 31, 1907, was only 4,624,553 tons of all kinds of manufactured steel products. In common with other lines of industry there was a material reduction in sales during the latter part of 1907. However, the bookings for January were 25 per cent. better than December, and for February 25 per cent better than January. As this report goes to press the bookings per day are at least 25 per cent. larger than those of February. The management expresses hopeful views of the future.

General Work in Progress.

At the close of the year the following are the principal improvements which are in progress at various plants of the subsidiary companies here designated:

Carnegie Steel Company: Duquesne Works—Two new blast furnaces, 18 new open hearth furnaces, electric power station, gas cleaning plant, one 2000-kw. steam driven generator, including buildings. Homestead Steel Works—New 72-in. plate mill; additional facilities at 23, 35 and 40 in. structural mills. Carrie Furnaces—Two new blast furnaces; additions to electric power plant. Ohio Works—Two new blast furnaces, 12 open hearth furnaces complete, new blooming mill, new bar and hoop mills.

Illinois Steel Company: South Works—Two additional gas driven blowing engines; ore, coke and limestone pockets at blast furnaces Nos. 1-4; extending electric station, including gas cleaning and washing machine; two additional steam turbines directly connected to two 1000-kw. generators; two rotary converters, in substations at north and south ends of plant; new pumping engine at central station and additional 24-in. water line; new coke storage yard at Stockton, Ind. Joliet Works—By-product coking plant, Koppér type, 275 ovens. North Works—New paint mill.

Lorain Steel Company: Johnstown Works—Enlargement of plant for manufacture of frogs, crossings, street and steam railroad special work. The additions will about double the capacity of the plant.

National Tube Company (Lorain, Ohio): Open hearth plant, six 50-ton furnaces; additional six-hole pit furnace and two additional gas producers; new galvanizing plant.

National Tube Company: The work of enlarging and rebuilding the National Works at McKeesport was continued during the year 1907. As stated in the previous year's report, this work will not be entirely completed until in 1908.

Shelby Steel Tube Company: At Ellwood City, Pa., work was continued during the year in the rebuilding and enlargement of the seamless tube mills. The work comprehends the ultimate removal to and concentration at Ellwood City of several of the smaller outlying plants of the company. The additions and improvements will largely increase the annual productive capacity of seamless tubes. One-half of the cost of the new work only is being charged to capital account.

American Steel & Wire Company: Newburgh Wire Works—Additional cold rolling machinery. Central Furnaces—Addition to power plant; extending dock and installing ore handling equipment. Waukegan Works—Enlarging spring mill building; new spring machinery; testing machine, tools, &c.; additional fine wire blocks. Rankin Works—New warehouse. Braddock Works—Additional wire drawing blocks. Allentown Works—New wire mill engine and wire drawing equipment. Trenton Works—Additional equipment for manufacture of wire rope and high grade wires. Cuyahoga Plant—New mill for rolling flats; 10 additional steel barges. Worcester Works—Additional buildings and equipment for the manufacture of insulated wire and cables; additional paper cable equipment; additional rope machinery; extension to building and additional equipment in spring department; new warehouse and siding at central department.

American Sheet & Tin Plate Company: New Philadelphia Works—One additional jobbing and one sheet mill. Scottdale Works—New galvanizing department. Guernsey Works—Four additional sheet mills. Canton Foundry—New furnace, including casting pit, yard crane and crane runway; additional roll machinery.

American Bridge Company: Elmira Plant—Construction of a new bridge plant having an annual capacity of 40,000 tons of finished structural work. The new plant is of modern type in every particular. Only 40 per cent. of the cost is being charged to capital account.

Union Steel Company: South Sharon Works—New shop building and overhead crane runway. Donora Works—New sewers; new triple expansion pump; 15 standard gauge cars; additional wire drawing equipment.

Clairton Steel Company: New 22-in. structural mill; new 14-in. structural mill; new steam driven generator, engine, &c., in power plant; new 24-in. water line and two 10,000,000-gal. centrifugal pumps.

Meeting of the Foundrymen's Weight Conference Committee.

The committee appointed by Chairman Henry A. Carpenter, under the resolution adopted at the February 5 conference of foundrymen with producers of pig iron and coke and transportation interests, held a meeting at the Bellevue-Stratford Hotel, Philadelphia, March 18, to organize and further consider the question of a means to overcome discrepancies between the shipping and outturn weights of these materials.

The morning session was held at 10 o'clock. J. L. Anthony, Weir Stove Company, Taunton, Mass., acting as temporary chairman, called the meeting to order at that hour and suggested the election of permanent officers. On motion, B. M. Shaw, Walker & Pratt Mfg. Company, Boston, Mass., was elected chairman, and August A. Miller, *The Iron Age*, Philadelphia, secretary. The meeting was officially declared a confidential one, and the various members immediately entered into a spirited discussion of the various subjects.

The morning session was given over entirely to the discussion of the coke question, while at the afternoon session the discussion of the pig iron question was given particular attention. While no definite action was taken by the committee, a number of points were brought out which will, no doubt, aid the foundrymen materially in obtaining a means of overcoming to a great extent the difficulties arising in connection with the short weight question. The committee will report to Chairman Carpenter of the general conference at a later date, it having been decided that the proceedings of the day be printed, after editing, for which purpose B. M. Shaw, J. L. Anthony and A. A. Miller were appointed. The meeting was exceptionally well attended, there being but one absentee, although several substitutions were made by those originally appointed and whose names were printed on page 853 of *The Iron Age* of March 12.

The annual dinner of the Traffic Club of Pittsburgh will be held in the Hotel Schenley on the evening of April 3. The principal speakers will be Robert Mather, president of the Chicago, Rock Island & Pacific Railroad Company, and Dr. Woodrow Wilson, president of Princeton University. During the day a terminal trip will be taken around the manufacturing plants in the Pittsburgh District, and lunch will be served at the plant of the Westinghouse Air Brake Company at Wilmerding, Pa.

Tests of Graphite on Ball Bearings.

The question of the value of graphite in the lubrication of ball bearings appears to be settled so far as its use in combination with oils or greases is concerned by the investigation made by Prof. W. F. M. Goss,* reported in the following from the Joseph Dixon Crucible Company, Jersey City, N. J. Six series of tests were run:

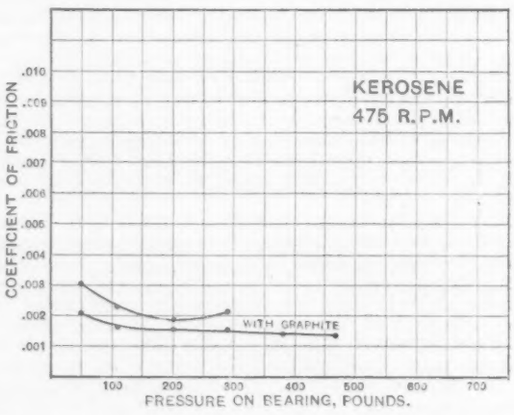


Fig. 1.—Kerosene With and Without Graphite.

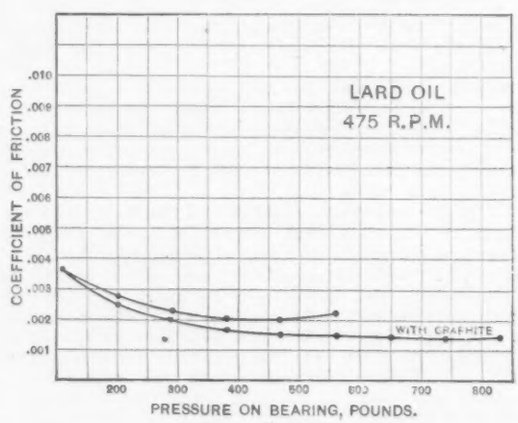


Fig. 2.—Lard Oil With and Without Graphite.

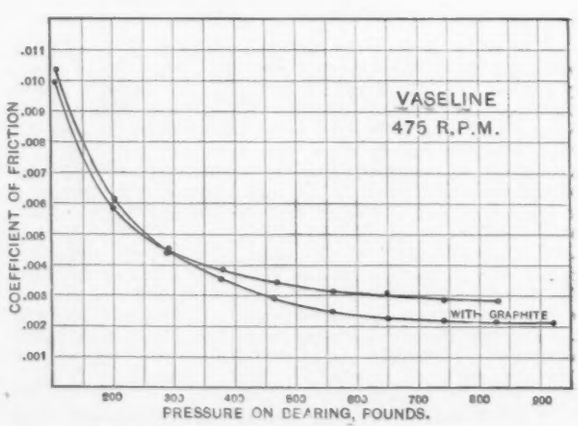


Fig. 3.—Vaseline With and Without Graphite.

Curves Comparing the Friction of a Ball Bearing with Various Lubricants Alone and in Combination with 4 Per Cent. of Dixon's Ticonderoga Flake Graphite.

three with kerosene, lard oil and vaseline singly, and three with each of these in combination with 4 per cent. of Dixon's Ticonderoga flake graphite. The curves, Figs. 1, 2 and 3 show the comparative results with each of the three lubricants alone and combined with the graphite. The curves not marked are the ones corresponding to tests in which no graphite was used.

The apparatus was the same in all of the tests and is illustrated in Fig. 4. In this the test ball bearing is

* Formerly dean of the Schools of Engineering, Purdue University; now dean of the College of Engineering of the University of Illinois.

shown at *b*. It has the form of a grooved ball thrust bearing and was made by the Standard Roller Bearing Company, Philadelphia, Pa. It consists of two hardened steel rings, each having a groove or race to receive the balls. The bearing fits a 1⅝-in. shaft and contains 23 7-16 in. balls. The lower race is caused to revolve through the action of the machine, while the upper one is fixed in position. The entire bearing is inclosed in the cup *d*. The cup is held in place by the wire *h*, which serves to oppose its tendency to turn, and also to receive the tensional stresses due to the normal loading of the bearing. A pointer attached to the lower part of the cup *d* plays over a scale on which the deflection may be read in terms of the coefficient of friction.

The lower race *b* rests upon the casting *a*, which is attached to the spindle of the machine. By means of the cone pulley *k* and the pulleys *j*, *j* and *j* the spindle may

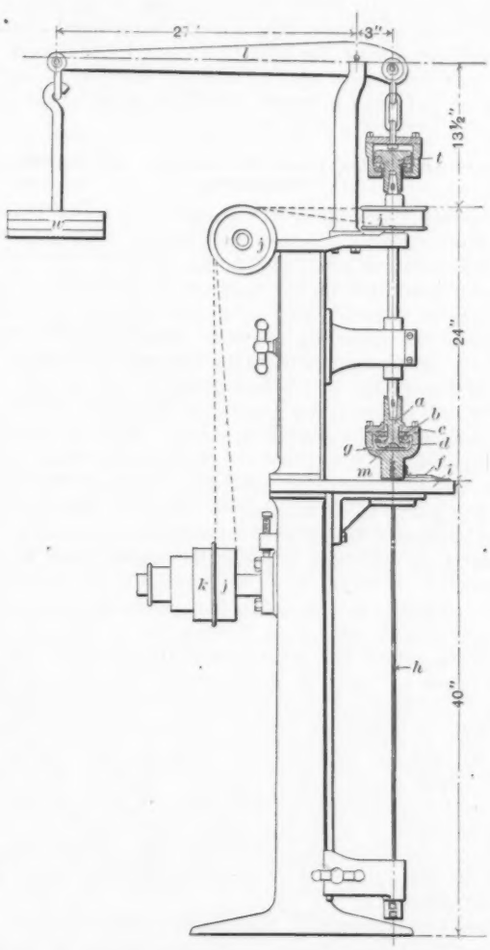


Fig. 4.—The Testing Machine and the Test Ball Bearing.

be driven at three different speeds. The pressure imposed upon the balls is regulated by means of weights applied to the lever arm *l*, which is of such length that each 10 lb. applied to the weight pan *w* gives a reaction of 90 lb. along the line of the spindle through the bearing *t* and thence to the test ball bearing. The bearing *t* is similar in all resepects to the test bearing, except that it is of greater capacity.

From the results of these tests Professor Goss draws the following general conclusions:

"A combination of graphite and lard oil makes up a lubricating mixture which, when applied to ball bearings, will accomplish everything which lard oil alone will do and which at the same time will give a lower frictional resistance of the bearing and permit a large increase in the load which it may be made to carry. An oil as light as kerosene, when intermixed with graphite, will be converted into an effective lubricant for ball bearings when operated under light or medium heavy pressure. Even so viscous a lubricant as vaseline will better perform a given service in the lubrication of ball bearings when supplemented by small amounts of graphite. The bearing to which the mixture is applied will work with less frictional resistance and will carry a heavier load than when vaseline alone is used. The admixture of graphite with either a liquid or a viscous lubricant serves both to reduce the friction and to increase the possible load which a bearing thus lubricated can be made to carry."

The Maintenance of Way Association at Chicago.

The concluding sessions on Wednesday and Thursday of the convention of the American Railway Engineering and Maintenance of Way Association, held in Chicago, March 17, 18 and 19, were occupied with the reading and discussion of reports of committees covering important phases of railroad engineering problems. These reports comprised the results of committee investigations, and in each case recommendations were presented to the meeting for consideration and action. Among the subjects which received prominent attention were the following: Uniform Rules for the Government of Supervisors of Signals; Signaling and Interlocking; Iron and Steel Structures; Track, Yards and Terminals; Rails.

The report of the Committee on Rail reviewed the report of the American Railway Association Committee on Standard Rail and Wheel Sections, and pointed out the desirability of all railroad companies uniting on rail sections. It also recommended a form of blank for reporting rail failures, which because of the letter sheet size adopted, its general simplicity and for other reasons was recommended for use in preference to a similar form designed by the American Railway Association and reported at the meeting of the latter organization in New York in October, 1907.

On Tuesday evening a paper on the "Strength and Endurance of Steel Rails," prepared by James E. Howard, engineer of tests at Watertown Arsenal, was read by J. P. Snow, bridge engineer of the Boston & Maine Railroad, the author being unable to be present. The paper is given elsewhere in this issue.

Coincident with this convention was held the annual meeting and exhibit of the Road and Track Supply Association. At this gathering 129 manufacturing and sales organizations were represented, and notwithstanding the limited space afforded for display in the parlors of the Auditorium Hotel, a large number of exhibits were grouped therein, representing a great variety of railroad appliances and equipment. On Thursday the annual convention of this body was held, at which time the following officers were elected:

President, George Stanton, sales manager Cleveland Frog & Crossing Company, Cleveland, Ohio; vice-president, W. F. Schleiter, secretary, Dilworth, Porter & Co., Pittsburgh, Pa.; secretary and treasurer, John N. Reynolds, vice-president, Wilson Company, Chicago; Executive Committee: John C. McKinnon, secretary and general manager Kalamazoo Railway Supply Company, Kalamazoo, Mich.; J. H. Martin, Hussey-Binns Shovel Company, Pittsburgh, Pa.; William Goldie, Sr., William Goldie, Jr., & Co., West Bay City, Mich.; T. W. Snow, president Otto Gas Engine Works, Chicago; Robert E. Belknap, Chicago agent Pennsylvania Steel Company and Maryland Steel Company; Theodore Huss, secretary and treasurer, Lufkin Rule Company, Saginaw, Mich.

The next monthly meeting of the American Society of Mechanical Engineers will be held in the auditorium of the Engineering Societies Building, New York, on the evening of April 14. The general subject of the meeting is the "Conservation of Our Natural Resources." Addresses will be made by four speakers who will consider forest preservation in its relation to water power, economy in the utilization of fuels and the attitude of the engineer in regard to these. Dr. Henry S. Pritchett, president of the Carnegie Foundation for the Advancement of Teaching, will be one of the speakers, and will discuss the "Relation of the Engineer to the Body Politic."

Machinery in Germany.

Capt. Godfrey L. Carden of the United States Revenue Cutter Service, an expert on the subject of machine tools, who is now investigating the opportunities for their increased sale abroad as a special agent of the Department of Commerce and Labor, makes his first report, writing from Berlin, February 10, as follows:

The machine tool business in eastern Prussia is at present quieter than at any time in the past 12 months. The large tool makers are for the most part building only for stock, and, generally speaking, the situation is regarded by the leading interests here as a reflex of the monetary outlook in America. While the conditions are quiet the German shops are, comparatively speaking, more active just now than those in America. This statement the writer bases on his personal observations, covering more than 30 of the leading machine tool houses in the United States during the period from December 18, 1907, to January 14, 1908. One of the best known of the Prussian machine houses, and the one which probably approximates closer to American standards than any other, is running practically all of its departments, and the statement was made to me by the chief director that the maximum number of men, 2000, was at present employed. While this establishment was apparently busy, it was admitted that the tools which are being produced are mostly for stock.

The foregoing statements with reference to the general situation, it must be emphasized, apply specifically to eastern Prussia. I am informed on good authority that, in general, the same conditions now hold along the Rhine and in Saxony.

Difference Between German and American Establishments.

From the best opinions which I have been able to obtain, the outlook for American machine tools in this territory depends, as it always has, on the merits of the machine. The American manufacturer who has not heretofore attempted to negotiate the European market will find that the German shops are turning out many tools which for ordinary shop work serve the purpose as well as the average American tool, and unless the German can buy the American machine tool much cheaper he may be expected to patronize his own market. But it is a fact that the majority of our American manufacturers can undersell in German territory the German tool manufacturers, and this despite the lower wages paid here. This condition is due to the American policy of specializing and to a higher standard of shop efficiency, which so many of our plants have attained. While very few of the German establishments attempt to confine themselves to a few lines of tools, it is common in America to find firms which make only one type of machine tool, and there are instances where only one size of tool has for many years been made.

The American machine tool houses which, for example, are engaged in making boring mills, may be expected not only to turn out a highly specialized tool, but to offer various sizes of this tool in a highly perfected form. Such American establishments can hope to undersell, every day in the year, a firm like a large one here which only occasionally makes, and then to order, a tool of the same type. This fact is recognized by the German firm, and that house will order from America tools of this type for its customers.

The same statement applies to lathes. There are a number of American engine lathes which cannot be produced in eastern Prussia as cheaply as in the American shop; but this alone would not suffice for their sale here did they not possess superior merit. In other words, we owe our ability to excel the foreigner, whenever we do excel him, to superior technical knowledge, and this technical knowledge covers not only the design of the machine, but the shop method involved in its construction.

Business Conditions Different—Failure to Make Prompt Deliveries.

An American tool manufacturer who has a good tool to offer, and is in a position to extend his trade, may calculate at the outset that he can undersell a European manufacturer. This will in general prove true, provided the American is specializing on his tool. He will find, however, when he comes to negotiate the Continent, that business conditions here are radically different from those at home. He may consider it advisable to assign his interests in various districts to local agents. The experience of our manufacturers has been varied in this respect. There are potent reasons why the business should be established by a general manager. It is not necessary that this manager know the language, but it is essential that he employ as assistant manager a man who is not only familiar with the country, but with its commercial law. Very often conditions arise which, if a general manager vested with the necessary authority were on the spot, could be dealt with to the advantage of the home company. A still more important reason is the necessity for having a responsible representative at hand who can appreciate the conditions of the territory. A statement was made recently to the writer by one of the first commercial men in Prussia that American business interests had suffered during the past two years by reason of the failure to make good representations regarding deliveries, and that had been a strong factor in assisting the business of a number of German shops.

Americans Who Lack Knowledge of European Practices.

Some of these latter statements may seem like the very rudiments of business requirements here, but the writer is frank to admit that he has been struck with the apparent ignorance on the part of many machine manufacturers in America, and even men who are presidents of prominent concerns, of what constitutes the latest and most up to date practice in Europe. It is this very lack of knowledge which has probably had much to do with the failure of many American machine houses to accomplish more in the outside world. There is, however, some excuse for this when we consider the great stress under which home firms have been engaged during the past few years in attempting to meet the enormous domestic demand. Under such conditions for many of our houses there has been little incentive to study foreign markets.

In contradistinction to the plan of sending a general manager abroad there is in Prussia one well-known German house which has earned an enviable reputation for the manner in which it has handled American machine tools. This firm has been engaged since 1892 in handling this form of American product, and during the period of 1897 to 1902 did an enormous business. The success of this German house was due both to the local knowledge it possessed of European conditions and its high business integrity. But it is not always possible for every manufacturer to be so fortunate in his foreign connections, and naturally the number of firms which one house can represent is limited.

The manufacturers of large machine tools, such as are required for heavy arsenal work, are feeling the present depression more than the makers of moderate sized tools.

Better Wages—American Tools Needed.

The rate of wages has increased in the German shops in recent years. The average wage paid at one large establishment is, I am informed, 70 pfennigs (about 17 cents) per man per hour, and for the most part the men are working there 9 hr. a day. A first-class man at the lathe is paid about 6 marks ($1.42) a day. The workman is probably of a higher standard in eastern Prussia, and particularly in the Berlin section, than in any other part of Germany, and a higher rate of speed is observable here in shop practice than at any time in the history of German machine tool building. When the German workman learns to use constantly those accurate measuring tools without which an American workman would deem himself lost, then, and not until then, may the former be regarded as a dangerous competitor. The introduction of gauges into Germany, as turned out by some of our best American houses, is serving as a potent means of educating the German workman. There are measuring instruments manufactured here, but I have yet to find that they are recognized as the equal of the best produced in America.

There is very little real competition here on the part of English firms.

The Russian territory will, I am told, shortly offer good selling opportunities, probably earlier than has generally been believed. Well informed circles here declare that there will be business in Russia before many months, and preparations are being made to take advantage of it. All agree, however, that the territory demands a higher degree of local knowledge than any other in Europe. Berlin, it should be understood, generally possesses the earliest and most reliable news from Russia.

Progress of German Ingenuity.

Fifteen years ago the machinery houses of eastern Prussia used many English tools. Now all this is changed, and in lieu of English tools only those of German make are found, with the exception that in the shops doing high grade work a group of American machine tools are used, a tribute to the excellence of the American output. How long this latter condition of affairs will exist depends entirely upon the ability of our manufacturers to keep ahead of foreign designers. Six years ago, when I had occasion to inspect some of these same German shops, I estimated that we were from eight to nine months ahead of the Germans, but now this margin has been reduced.

What concerns American manufacturers vitally is the fact that the Germans are putting more engineering thought into their designs than at any time in the history of tool construction. The mechanical skill still holds in favor of the Americans, and will probably remain to their credit in the case of those American firms which are paying close attention to the drawing room. It is the new establishment that must take heed that when its tools are introduced into Germany every feature of those tools will be the subject of a close scrutiny, and if engineering skill backed up by careful mathematical deductions will make it possible to produce a better machine, the Germans will be among the first to discover the fact. The American firm need not then be surprised if, in a very short time, there is found on the market a similar German tool, possibly American in its original idea, but essentially German in its improved technical form.

The Importance of Technical Knowledge.

We excel the foreigner, whenever we do excel him, by reason of superior technical knowledge. This is the crux of the whole situation, and it is sheer madness for any American firm which proposes to hold its own in foreign competition to ignore technical education. There is a well founded belief here that the loss of English trade in machine tools has been due to this very lack of technical training. Committees of boards of trade in England which have endeavored to ascertain the cause for the English loss of business in machine tools in Germany have ascribed various reasons for this, but the German has summed it up by declaring that it is no longer necessary for him to go to England for superior tools. There are exceptions, of course, to this statement, but in the main the conclusion seems to be right.

At the great Borsig plant at Tegel, near Berlin, I find only American pneumatic tools in use. There are pneumatic tools made in Germany, but there was no hesitancy in stating to me at the Borsig plant that the American pneumatic tools were purchased because they are considered superior to those of German design. How long this will continue is problematical. There seems to be little question that the American pneumatic tool manufacturer can meet the German in prices for some time to come—certainly he can undersell him at present—but it is noteworthy that recent German designs of this form of tool are showing marked improvement.

The firm of A. Borsig at present employs approximately 5000 men. The shop managers have learned wonderfully well how to get the maximum capacity of work out of tools. There could undoubtedly be reductions made in the force employed, but there can be no mistake about the tools working at practically 100 per cent. efficiency. It would be refreshing for some of our American manufacturers, who believe that we alone understand the term "shop efficiency," to take a walk through these shops, and I believe that a glimpse of the workings of this particular plant would cause a realization of what there is ahead of America in foreign competition.

Efficiency of German Machinery.

To be sure, Borsig stands in a class by himself. He is a user of machine tools and not a maker, like the Ludwig Loewe Aktien-Gesellschaft. Borsig demands the highest grade of tools obtainable, and in particular he wants tools which will give him both high grade results and speed. He uses planers, gear cutters, lathes, milling machines, and practically the entire gamut of tools required in locomotive construction, boiler work, &c. His plant fairly bristles with high grade American machine tools, but only those of the best American make. The manufacturer's agent who has a tool of late construction and superior merit to offer should have no hesitancy in going to such a firm, and this statement applies not only to Borsig, but to every other first-class German house; in other words, let there be no misunderstanding on the part of our machine tool makers that the Germans are turning out to-day machinery of a wonderfully high standard. This standard demands high grade tools for its production, and the market exists here for the American machine tool makers who have a superior tool to offer.

To better understand the situation, it must be borne in mind that practically one-half of the machinery production in Prussia is for export. Borsigs state that considerable over one-half of what they produce is for foreign countries, and quite recently this foreign trade has been considerably augmented by substantial orders from French territory. The French have not at all been inclined, for many years, to patronize German houses, but the merit of German production has forced itself even on the French buyer, and, at this writing, Borsig, for example, has in hand a considerable number of locomotives for French railroads.

Probably the greatest danger which the American manufacturer has to meet abroad is enhanced shop efficiency. The Germans are not economical in man labor, but they are learning. They are realizing more and more the possibilities in tools, and in every particular the German workman is improving. I know of the Germans using two men with a gear cutter where the American designer of the tool never contemplated that more than one man should be employed. They know better than this at Borsig's, and there are other German plants which would not be guilty of the same practice.

Learning from America.

On the whole, they do not yet understand, in the great majority of the German shops, how to operate the greatest number of tools with the least number of men. This calls for the highest degree of intelligence and skill, such as is found to-day in the most enhanced form in our best American shops. We have not been giving the German credit for learning in the same line, but he is learning, and is learning fast; and if we propose to keep ahead in shop efficiency, and in our ability to run a shop with the least possible number of men, we must look to the training of our workmen from boyhood up. In some shops the schools for the apprentices are in the shops. These schools are presided over by men who operate the shops. The apprentice works in the schoolroom either early in the morning, when he first comes to work, or at some other hour in the day, and the time devoted to the schoolroom is deducted from his wages. The education of the apprentice is the very antithesis of haphazard. It is on careful and well thought out lines, and always with the one view of developing him into a highly skilled and technically trained workman for the firm where he is employed.

In the issue of *The Iron Age* of March 12 our Birmingham correspondent reported that none of the charcoal furnaces of the South is now in operation. This was an error, as we are advised that the Rock Run Furnace, operated by the Bass Foundry & Machine Company, located at Rock Run, Ala., has not shut down at any time except for necessary repairs since 1892. The management expects to keep the furnace in operation throughout the present year, unless business should become very much worse.

Strength and Endurance of Steel Rails.*

The Watertown Laboratory's Investigations.

BY JAMES E. HOWARD.

In the use of steel rails, as with other materials of construction, interest is directed to the subject of the limiting values of applied stresses, their accurate definition and how closely they may be approached with safety under those conditions of service which pertain to the specific uses of the materials in question. In the constructive arts may be found examples of steel exposed to different kinds of stresses, and in varying degrees of intensity, but it is not recalled where there are instances of greater diversity of action than witnessed in the case of steel rails. The whole gamut of conditions is here present in the same piece of metal, and a feature of unusual occurrence in the use of steel lies in the fact that the stresses are received on so limited an area of contact at the running surface of the rail heads. The feature of intense local pressure between the wheels and the rail is an important one, and one which does not admit of the adoption of those corrective measures which can be applied to other features of the rail question.

Tests have been made on rails at the Watertown arsenal laboratory in earlier years, while at present a series is in progress in connection with the current programme on ingots and derivative shapes. In the present tests the laboratory is working in co-operation with and aided by members of this association and others, which places beyond a doubt the fact that results of great value will be attained.

Loss of Toughness.

Referring to the earlier work of the laboratory, the tests comprised rails of domestic manufacture, some of the early English rails and an example or two of French and German make. Many of these had been in service. Among the features of interest developed by the tests it was shown that rails from the track were generally less tough when loaded so that the head was in tension; in fact they were very brittle when so loaded, and fractured with comparatively little permanent deflection. Upon planing off metal from the running surface of the head the rail was restored to a tough condition and then bent well with either the head or the base on the tension side. Planing off ⅛ in. of metal was sufficient to affect the restoration, but it was necessary to remove all of the affected metal, which included some from the sides as well as that from the top of the head. A restoration in toughness was also accomplished by annealing the rail, without planing off any of the metal.

This loss in toughness is due to the flow of the metal under the wheel pressures. It will, of course, take place promptly and quite easily in the softer grades of steel. From this point of view a soft steel has the advantage of low strength and is not immune from brittleness, notwithstanding the primitive toughness of the metal. The original properties of such steel are apt to be misleading and encourage greater confidence in its ductility than is warranted by its subsequent behavior. It does not follow, however, that the initially harder steels will not also become more brittle at the running surface of the head of the rail, since all grades of steel are probably affected in this manner by wheel pressures as they are now used. It is not known whether present service conditions are such as to enable the metal at the immediate surface of the head of the rail to retain its primitive tensile properties unimpaired until lost by abrasion and wear. In the harder rails the depth of the affected metal is thought to be less than in the softer rails, but still of appreciable depth and influence on the toughness of the steel.

The exhaustion of ductility is due to the relative flow of the metal of the surface of the head with relation to the other parts of the rail, and not per se to the high compressive stress between the wheel and the rail. Other tests have demonstrated that high compressive stresses unaccompanied by relative displacement of the metal does not change the physical properties when subsequently tested by tension. High compressive stresses of this kind may be applied in tests by cubic compression, specimens being immersed and subjected to hydrostatic pressure, such tests having been made with pressures up to 100,000 lb. per square inch.

Lowering the Elastic Limit.

Tests on alternate tension and compression have shown that overstraining in either direction lowers the opposite elastic limit; that is, a load of tension applied in excess of the elastic limit has a detrimental effect on the compressive elastic limit, materially lowering the latter value. Upon making similar tests with steel rails, but loading them transversely instead of by direct tension and compression, it was found that the application of a high load —one causing decided permanent sets—resulted in lowering the elastic limit of the rail when it was reversed in position and loaded in the opposite direction. The reexamination of a rail after the lapse of 14 months' time failed to show a restoration of this disturbed state during the interval of rest. Repeated reversals resulted in lessening the magnitude of the deflection sets, over the first display, an effect which would pass as a stiffening of the rail in common parlance, although the modulus of elasticity of the steel is lowered by overstraining of the metal. Heating the metal to a red heat effected a partial restoration but did not fully return the rail to its original condition as regards the development of sets. The effect on the surfacing of the track from overloading a rail is apparent from these results.

Since the cold straightening of a rail at the time of manufacture is another illustration of loading beyond its elastic limit, similar results to the foregoing are certain to follow. A rail thus straightened is left in a state of initial strain, in equilibrium when without a load but in condition to develop sets in the track upon the reapplication of very moderate loads. The opposing internal strains augment the effects of the wheel loads and facilitate early sets. Surfaces of metal first to cool from higher temperatures are put into a final state of initial compression, and this tends to add to the complexity of the situation in the case of rails.

The lines of magnetic scale which leave the rail in the vicinity of the gagged parts show where the steel has been overstrained locally. Unless the metal is structurally unsound in the paths of such lines, no unfavorable results would be immediately looked for in consequence of the gagging. The number of repeated stresses and their magnitude necessary to cause rupture of the steel would be such as to relieve anxiety as to the early rupture of the rail from this cause, although this action, such as it is, is a detrimental one. While a given effect is more easily produced in a soft steel rail than in a hard one, on account of the difference in strength, yet a slight defect existing in the hard metal is of greater consequence than in the softer metal.

Tracing Causes of Rupture.

Seemingly minor and accidental causes may lead to early rupture. So slight are some which have located rupture (abrasion of the base by a spike, an indentation of the flange by a chance hammer blow) that a larger number of broken rails will be expected, provided service conditions become more severe. It affords aid in judging of the cause of rupture to trace back the line of fracture to its point of incipiency. Fortunately in steel fractures this may generally be done. A well defined nucleus marks the origin of a granular fracture, from which a fan like or radiant structure diverges. It is usually possible also to tell the order in which the fractures occurred, when more than one surface is presented, by inspection of the fractures and noting their appearances as indicated. In this way rail fractures might be exhibited in which the first break detached a moon shaped fragment from one flange, having its origin near the middle of the base, which was followed by a secondary fracture separating the other flange and extending up through the web and then through the head; fractures beginning at one edge of the flange, extending across the base and

* A paper read at the ninth annual meeting of the American Railway Engineering and Maintenance of Way Association, Chicago, March 17-19, 1908. Mr. Howard is engineer of tests at Watertown Arsenal.

thence through the rest of the rail; fractures beginning at a bolt hole and extending each way until the fracture is complete; or fractures having their origin at the running surface of the head and extending downward through the rail.

Service conditions and influences which contribute toward fracture of the rail have been mentioned in the preceding remarks, and among them one of the most important is that of flow of the metal under the wheel pressures. Whatever may be done to strengthen the rail in other respects, the fact still remains that the load is applied on a very limited surface of contact. This obstacle is insuperable, and imposes a limit on the magnitude of concentrated wheel loads.

Structural Defects.

The influences which have been enumerated tend to develop fractures in rails structurally sound and having good physical properties, but it is recognized that rails are not always free from structural defects, although they may be in possession of satisfactory tensile properties. Some of the structural defects are of a serious character and apparently have led to a considerable number of rail fractures in recent years. It has been found in a number of rails examined that longitudinal streaks are present in both the head and in the base, streaks of a different color from the adjacent metal, as they appear when etched with tincture of iodine. Some of the streaks are several feet long, others a few inches or only a fraction of an inch in length. The streaks are of different widths, from a few hundredths of an inch to upward of an eighth of an inch, and not infrequently have a fine hair line or crack along the middle of their width. The cracks are commonly short, less than an inch in length, and in depth penetrating the metal but a few hundredths of an inch. They are in some rails quite numerous, and in planing the metal away for purposes of examination new hair lines appear in succession as those first in view are planed away. The steel fractures, without elongation, when ruptured by stresses applied at right angles to the direction of the cracks. That the streaks represent lines of weakness there is hardly a doubt, and their elimination if practicable is desirable and would be of advantage to the rails. The development of moon shaped fractures may be traced to streaks or hair cracks in the rail at or near the surface of the base. Deep interest attaches to the ascertainment of the causes of these lines of structural unsoundness or lack of continuity and by what means they may be avoided, if such is possible.

The presence of these streaks and fissures is not a matter of recent occurrence. They are found in rails of early manufacture, and even more pronounced than is generally the case of rails of current make. The examinations of a number of rails of early English manufacture show streaks and fine cracks present. They have been found in rails of domestic make from different mills and from a sufficient number to establish their universal character. It does not seem to be the case, however, that all rails from the same mill are equally affected. There are wide differences among them, although it may be difficult to find those which are strictly sound throughout.

It may safely be said that there is urgent need of information, to be developed in a connected manner from the state of the metal in the ingot through each successive stage to the finished rail. In this inquiry all the metal from the several ingots comprised in the series of tests should be available for examination. This has reference to the metal usually discarded from the ingot, and to crop ends of the rails, which should be comprised in the tests as well as the portions of the ingots made use of in the rails. These rail tests are comprised in the general series on "Ingots and Derivative Shapes," previously mentioned, in which the laboratory was aided by a committee of engineers.

Discussion.

The above paper was read in the absence of the author by J. P. Snow, bridge engineer of the Boston & Maine Railroad. Mr. Snow also presented a number of lantern slides, six of which are reproduced herewith, and are the result of current work of the Watertown laboratory. In Figs. 1-4 defects which in the rail appear as longitudinal streaks first show in the bloom in an irregular ring about half way between the center and the outer surface, and can be traced through the various processes of rolling to the finished rail. Mr. Snow gave the following description of these views:

In the section of an 8 x 8 in. rail bloom (Fig. 1) the spotted circle of darker marking will be noticed. This

Fig. 1.—Cross Section of an 8 x 8 In. Rail Bloom, Rolled from an Ingot 20 In. Square.

bloom was reduced from an ingot about 20 in. square. A section of the ingot reduction was examined, but no markings such as are shown on the blooms were brought out upon etching it. The two succeeding cross sections of rails (Figs. 2 and 3) show subsequent stages in the reduction of a portion of the same bloom in the roughing rolls, the markings becoming a little more pronounced in the later than in the earlier pass. The cross section of a

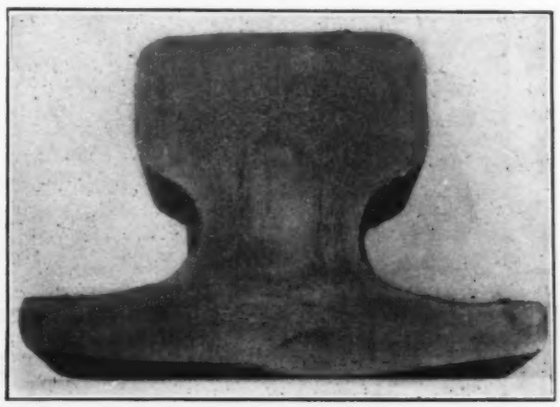


Fig. 2.—Rail from an Early Pass in Roughing Rolls of the Bloom Shown in Fig. 1.

finished rail from the same ingot (Fig. 4) shows the familiar lines often witnessed in rails.

Fig. 5, showing the head of a modern rail, illustrates the white streaks which occur so commonly in rail steel. Along the middle of the width of some of these streaks hair lines or cracks are evident, in which there is plainly a separation of the metal. In all the white streaks that I have examined with a high power microscope I have found cracks at some points of their length. A well defined crack will usually be found pinching out to a series of very short cracks, exactly in line, but perhaps only a few hundredths of an inch long. After these there may

occur clusters of small holes, four or five together, so small as to be hardly discernible with a magnification of 200 diameters. Following this the white streak will be in evidence, looking under the microscope like a pathway strewn with light colored gravel, not very well

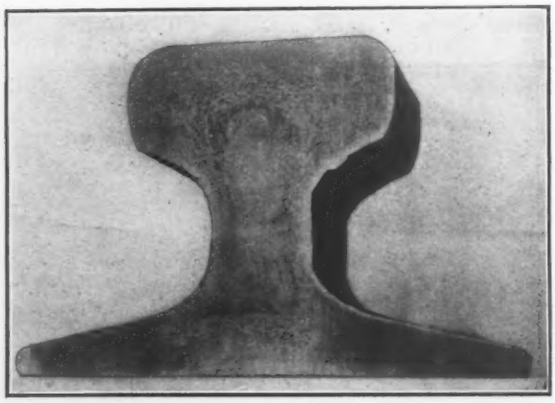


Fig. 3.—Same Rail as in Fig. 2, After Further Reduction in Roughing Rolls.

spread. There will frequently be seen clusters of white metal similar to a shovelful of gravel dumped in one place. At the sides of the streak white specks will appear like the scattered gravel of a walk at its edge, and at one point I observed a plumelike spray branching out from one side of the streak, looking for all the world like a shovelful of gravel, spread in a curved line outside of the line of a walk. The white specks are not rounded like gravel, but seem to be little chips, which might be cut by the polishing grit and caught on the fibers of the adjacent steel. The white metal looks as if it was softer than the ordinary metal surrounding it. This is not proved, but is only an appearance.

Fig. 6 shows the streaks in the head of an early rail, made by the Landore-Siemens Company. These streaks

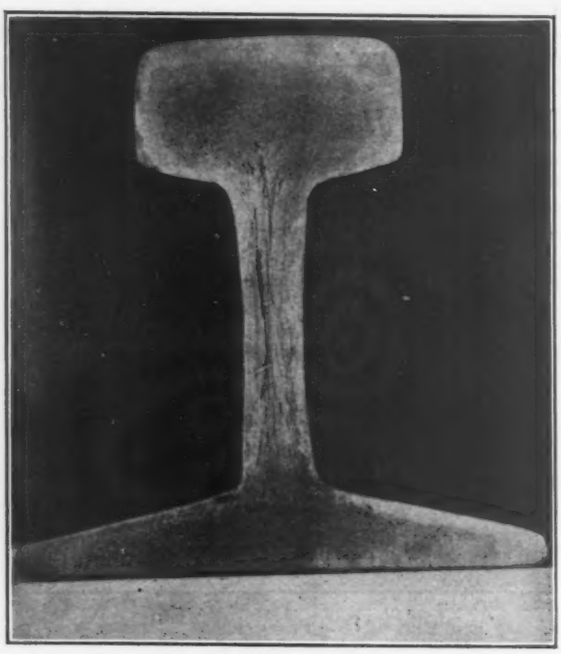


Fig. 4.—Finished Rail from the Same Ingot as the Bloom and Pieces Shown in Figs. 1-3.

appear to be of the dark variety and of a broken character, which will not cause a break or crack to develop as easily as is the case in the modern rail, in which the streaks are continuous and of a lighter color.

Flange Breaks and Split Heads.

Mr. Snow then exhibited a piece of rail, on the head of which the longitudinal section was made as shown in Fig. 5, and commented as follows on the causes of rail breakages:

White streaks appear in the deeper cuts (the specimens had been planed to different depths), but they are generally not in line with those above, showing that they are diffused throughout the metal. As we get deeper into the metal, however, white streaks become scarce and finally disappear, but in this particular specimen the deeper cuts show dark streaks. These are not so definite in their widths as the white streaks, but they penetrate the metal somewhat deeper and show in the end section of the rail, whereas the white streaks do not show in this location. White streaks with their accompanying cracks lead to flange breaks and perhaps to split heads. Dark streaks appear to be the result of segregation and lead to crushing of the head. In addition to these two kinds of streaks there is another defect which is not in evidence on this specimen, but is very common in the rails rolled during recent years. I have previously called the cracks found in white streaks "gas seams." I called the defects which I am now describing "rolling flaws." The cracks of the gas seams are strictly parallel to the rolling and straight. The plane of the cracks is also at right angles to the surface of the metal. The seams called rolling flaws are parallel to the rolling in a general way, but are usually somewhat crooked. They are similar to the flaws called snakes in plates, but in the case of rails they are practically straight. The planes of these seams are generally inclined to the surface of the

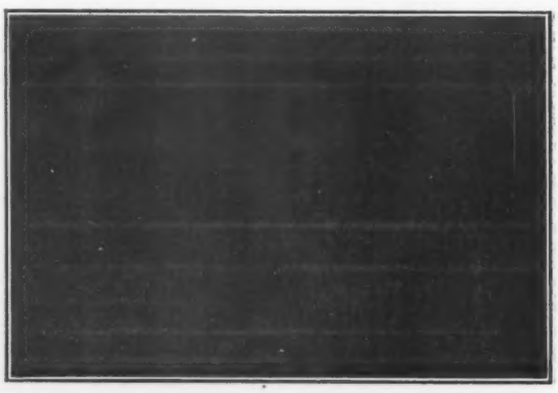


Fig. 5.—Streaks on the Head of a Modern Rail.

metal, and their sides are fluted and usually of a bluish color, similar to mill scale, indicating that they were oxidized while the metal was hot.

The crescent fractures I have examined have almost all shown their origin to be one of these rolling flaws, although occasionally the origin seems to be a gas seam, but my observation leads me to think that by far the larger number of recent breaks are due to seams of the rolling flaw type. The older rails which have been examined, while they show plenty of white and dark streaks, do not exhibit the defects which I call rolling flaws, this undoubtedly accounting for the greater prevalence of flange breaks and split heads in rails of recent make. In view of the facts that all of the crescent breaks which I have examined—and that is a good many—it has always been possible to discover a manifest flaw from which the break started; and from the fact that Mr. Howard in his paper claims that this class of breaks is due to seams which are in the rails when they leave the mill, I claim that the case is fully proved that flange breaks and perhaps split heads are due to incipient flaws existing in the rails when purchased. It is a remarkable fact that the rail tests prescribed in our specifications do not in any way tend to develop these defects. I wish to recommend that tests be prescribed, which will show whether these flaws exist or not.

Gas Seams and Shrinkage Cracks.

Perhaps I ought to rest my case here, as it is all that has been fully proved. The temptation is strong, however, to make guesses at what causes these defects. I stated in a paper printed in Bulletin No. 93 that in my opinion the flaws here called "gas seams" were due to gas bubbles in the ingot. I still think so, but the flaws

which I call rolling flaws appear to me to be due to shrinkage cracks, or checks in the ingots, or tears in the bloom, and perhaps the gas holes are so near the surface of the ingot as to burst out to the outside in the soaking pit, due to softening the metal, or afterward to the pressure of the blooming rolls.

If we go a little farther and try to investigate the cause of gas bubbles in the ingot, we get on more uncertain ground. Professor Howe of Columbia University claims they are largely due to mechanical action, the shrinking of the interior of the ingot tending to cause tension in the plastic metal, thereby relieving the pressure and allowing the evolution of gas. The metallurgist of the Illinois Steel Company, Mr. Von Maltitz, in a paper read before the London meeting of the American Institute of Mining Engineers, claims that they are wholly due to chemical and thermic action. Both of these investigators prescribe means of lessening the difficulty. As to the cause of the cracks, &c., which lead to rolling flaws, the remedy is self-evident. Chipping ingots and blooms, as was formerly done, will remedy the shrinkage cracks, checks and gas holes. Less severe reduction in the blooming and roughing rolls will obviate tears, provided the metal is not unduly hot, short from excess of oxygen or sulphur. Mr. Howard is on the trail of these defects. We ought to encourage him all that we can to trace them to their origin, whether it be in the rolling, the ingot, the ladle or the bath.

Wm. R. Webster, referring to the calling in of a number of engineers to assist in the investigations at the Watertown laboratory, said that the whole matter was brought up originally by a report of Mr. Howard to the Ordnance Bureau, suggesting an investigation of this kind, and asking for a larger appropriation. The appropriation for this year's work is about $35,000, or about twice the amount received before. Two committees have been appointed, one on compression members and the other on ingot structure, blooms and billets. Both have

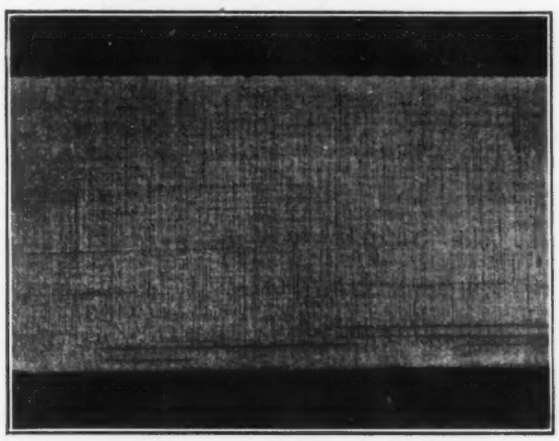


Fig. 6.—Dark, Broken Streaks on the Head of a Landore-Siemens Rail of Early Manufacture.

their work under way. Railroad engineers and some steel manufacturers are co-operating, the latter freely furnishing samples of their material, including ingots and finished products.

The Association of Swedish Iron Works finds that the exports of iron and steel from that country in 1907 were 398,700 tons, or 1800 tons less than in 1906. Bars showed the highest total, 154,200 tons, a decrease of 40,200 tons. The pig iron total was 129,000 tons, an increase of 17,600 tons. The production of pig iron in 1907 amounted to 603,400 tons, or 8200 tons in excess of 1906; that of billets, blooms, &c., was 588,300 tons, or 23,000 tons increase. The average production of the past 10 years has been: Pig iron, 533,200 tons; blooms, billets, &c., 500,500 tons. These are all metric tons—2204 lb.

Parker V. P. Dodge, Pittsburgh representative of the Youngstown Car Mfg. Company, manufacturer of industrial cars, is now permanently located in Room 406, House Building, Pittsburgh, Pa.

Canadian Mineral Output in 1907.

TORONTO, March 21, 1908.—The Canadian Department of Mines has issued its preliminary report on the mineral production of Canada in the calendar year 1907. It shows that the total value of the Dominion's mineral output in that year was $86,183,477, as compared with $79,057,308 in 1906. The metallic products were valued at $42,434,087. Included in the total for 1907 are the following items:

Product.	Quantity.	Value.
Metallic.		
Antimony ore, tons	2,016	$65,000
Copper, pounds	57,381,746	11,478,644
Gold	.....	8,264,765
Iron ore (exports), tons	25,901	45,907
Pig iron from Canadian ore, tons	107,599	1,982,307
Lead, pounds	47,565,000	2,532,836
Nickel, pounds	21,189,793	9,535,407
Silver, ounces	12,750,044	8,329,221
Cobalt, zinc and other metallic products	.....	200,000
Nonmetallic.		
Asbestos, net tons	62,018	2,482,984
Asbestic, net tons	28,519	22,059
Chromite, net tons	7,196	72,901
Coal, net tons	10,510,961	24,560,238
Peat, net tons	50	200
Corundum, net tons	1,892	177,922
Feldspar, net tons	12,584	29,809
Graphite, net tons	579	16,000
Grindstones, net tons	5,382	46,876
Gypsum, net tons	475,508	642,470
Limestone for flux in iron furnaces, net tons	359,503	298,097
Mica, net tons	.....	333,022
Natural gas	.....	748,581
Petroleum, barrels	788,872	1,057,088

Besides the pig iron from Canadian ore, whose aggregate quantity and value are given in the foregoing table, there is the much greater production of pig iron made from imported ore. This is shown in a footnote to amount to 544,363 net tons, valued at $7,142,919. The imported ore thus worked up in Canadian furnaces came from the Lake Superior District of the United States and the Belle Island mines of Newfoundland. Small though it still is, the output of pig iron made from Canadian ore is about 2¾ per cent. greater in quantity than it was in 1906. The new furnace at Port Arthur ran almost exclusively on domestic ore. The total shipments of iron ore from mines in Canada in 1907 were 310,996 net tons, valued at $662,441 at the mine, as compared with total shipments of 248,831 tons, valued at $589,206, in 1906. In 1907 Canada exported 27,453 net tons of iron ore to the United States. As has been shown, the total production of pig iron made in Canadian furnaces from domestic and imported ore was 651,962 net tons, valued at $9,125,226. This quantity is 9 per cent. greater than the output of 1906. Ferro-products, made in electric furnaces, are not included in this aggregate. Charcoal was used as fuel in the production of only 10,047 tons, coke being used in the smelting of the remaining 641,915 tons. The amount of Canadian ore, including mill cinder, &c., used in the Canadian manufacture of pig iron was 244,104 tons, and the quantity of imported ore used was 1,117,260 tons. The total amount of coke used was 847,150 net tons, valued at $3,383,223. Of this quantity 520,068 tons, valued at $1,652,125, was made in Canadian ovens. The figures relating to the pig iron production were obtained directly by the department from nine companies operating 16 furnaces. Returns from seven companies making steel showed a total output during the year of ingots and castings amounting to 706,982 net tons, valued at $16,612,590. Of this quantity 685,229 tons was in ingots and 21,753 tons in castings. Of the ingots made 225,989 tons was Bessemer steel and 459,240 tons open hearth. All but 1151 tons of the castings was open hearth steel. The total bounties paid on iron and steel during the year were as follows:

	Tons.	Bounty.
Pig iron, made from Canadian ore	95,914.97	$201,421.47
Pig iron, made from imported ore	537,803.45	591,583.80
Total pig iron	633,718.42	$793,005.27
Steel ingots	666,589.87	$1,099,873.37
Steel wire rods	68,738.22	412,417.26
Total bounty paid on iron and steel	.....	$2,305,295.90

Metallic products to the value of $14,592,118 and non-

metallic $10,033,600, making a total of $24,625,718. The gold produced was valued at $66,399; silver, $5,927,858; cobalt, $92,751; nickel, $2,271,616; copper, $1,045,511; iron ore, $471,126; pig iron, $4,716,857. C. A. C. J.

Harbor Improvements at Cleveland, Ohio.

As the volume of ore, coal and grain carried by the Great Lakes has steadily increased in the last few years, larger vessels have been found necessary. The majority of those now in use are more than 600 ft. long, and the harbor facilities at the principal lake ports are no longer adequate to accommodate them. Among the cities which have taken steps to improve and develop the internal harbor systems afforded by the rivers is Cleveland, Ohio, at the mouth of the Cuyahoga River. Improving this river means not only conserving vested interests, but developing the entire valley of the river into advantageous and economical sites for manufacturing industries and railroad terminals.

The Cuyahoga River pursues a very winding course for several miles through the heart of Cleveland. It has only one branch, known as the Old River Bed, which runs westerly for about a mile from a point a few hundred feet inside of the harbor mouth. The river originally was narrow, shallow and crooked, but has been widened, deepened and straightened, and projects are now pending that will remove the remaining natural obstructions in the course of the stream.

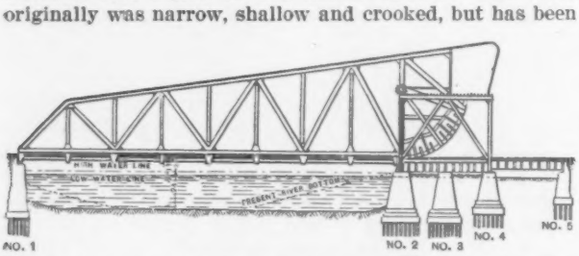


Fig. 2.—Elevation of the Bridge, Showing the Method of Rolling the Counterbalanced Structure.

The provision of movable bridges has naturally been an important consideration, and more than 20 highway and railroad bridges now span the river. These structures were originally nearly all of the center pier swing type, and for the most part hampered the passing of large vessels. A number of these have now been replaced by rolling lift bridges, which leave the channel unobstructed. Such a one is that recently substituted by the Baltimore & Ohio Railroad Company for its bridge across the Old River Bed on the line of West River street. It is a long span single leaf Scherzer rolling lift bridge and was completed and placed in service a few months ago.

This bridge, shown in Fig. 1, replaced a swing bridge used by the railroad company for many years to reach the extensive ore docks on the north side of the river. The old bridge had its center pier on the west side of the river, with an approach extending well out into the channel on the opposite side. In the new structure the main supporting piers on which the bridge rolls are placed on the east side of the river, with the front or rest pier on the edge of the far side of the channel, making the entire width of the river available for navigation. A particular advantage of the rolling lift bridge is that it makes available all dock space adjacent to the bridge; the disadvantage of the swing bridge in this respect is especially apparent when the main pier is located at one side of the channel, as it was in this instance.

Fig. 1.—The 230-Ft. Span Scherzer Rolling Lift Bridge for the Baltimore & Ohio Railroad at Cleveland, Ohio.

An elevation of the new bridge is shown in Fig. 2. The bridge carries a single track and has a movable span measuring 230 ft. from center to center of bearings, the longest span single leaf bascule bridge in the world. The clear channel for navigation, measured between faces of piers, is 210 ft. The total length of steel work, including the short plate girder fixed approach span at the rear end of the bridge, is 334 ft. The width is 20 ft. from center to center of the trusses, and the minimum clearance above the ties is 22 ft. The counterweight is of Portland cement concrete carried in steel boxes in the plane of each truss, the bridge being counterweighted so as to be at rest in all positions.

The bridge is operated by two 75-hp. alternating current electric motors. In the operator's house are placed the controller governing the motors and an independent switch which operates the solenoid brakes on the motors. As may be seen in Fig. 2, the power is applied in the operation of the bridge by pinions on the main operating shaft engaging with fixed racks placed on independent supports outside of each truss. Indicators in the operator's house show all positions of the bridge during operation and also the positions of the end latch. Signals are placed at each end of the bridge, interlocked with derailing switches and with the end latch and main operating controller, so that the bridge cannot be operated until these signals have been set at "danger" and the derailing switches opened.

The substructure consists of one front pier, three main piers carrying the track girders on which the bridge rolls, and an abutment supporting the rear end of the plate

girder approach span. These piers are of concrete carried on piles. The bridge was erected in its open position without interfering with the railroad traffic over the old swing bridge or the opening of that bridge to pass vessels. The front pier of the new bridge was constructed under the old swing span on the channel side of the center pier. The main piers of the new bridge were built under the approach to the swing, the superstructure being erected on these piers so as to provide ample clearance for the operation of trains over the old bridge at all times.

The bridge was constructed under the superintendence of J. E. Greiner, assistant chief engineer of the Baltimore & Ohio Railroad Company. The design was prepared in accordance with the railroad company's specifications for material and workmanship for steel structures and the design and erection of bridges. The design of the superstructure, operating machinery and electrical equipment was the work of the Scherzer Rolling Lift Bridge Company, Chicago, which company also maintained a general consulting engineering supervision over the construction and erection of the bridge. The substructure was designed and built by the railroad company. The contract for the superstructure was executed by the King Bridge Company, Cleveland, and the erection of the steel work by the Pittsburgh Construction Company.

The Proposed Advance in Freight Rates.

BY R. L. ARDREY.

Railroad traffic managers are practically unanimous in disapproving of the contemplated horizontal advance in freight rates, and it is understood that the carriers will proceed very cautiously in the readjustment of their tariffs. Packing house products and some other commodities are slated for an immediate advance, but the only important branch of the iron trade that is affected thus far is the cast iron pipe interest. The traffic experts of the railroads express privately the opinion that a general advance at this time in all rates would have a tendency to check the recovery of trade, and it is probable that a general readjustment will be deferred until late in the fall or early winter.

Until a few years ago it was a custom of the railroads to give "discounts" from their rates, especially on commodity freight, whenever trade depression left them with large numbers of empty cars on their hands. There was more or less abuse of this practice of discounting rates, but the primary reason for it was the desire to fill empty cars and encourage the movement of traffic. In the past 10 years freight traffic has grown so rapidly that the reason for giving rebates or discounts disappeared, but the old-time traffic managers make no secret of the fact that if the laws had not become so rigid they could do much to-day to promote the recovery of business by making rates that would encourage the industries of the country. The railroads never had so many idle cars and locomotives on their sidings as they have had the past winter, and the advocates of the proposed advance in rates will have difficulty in overcoming the objections of their traffic experts.

New Methods of Rate Making.

When this general readjustment takes effect the shippers of the country will have an opportunity to get better acquainted with the new method of rate making which the railroads have adopted, with the approval of the Interstate Commerce Commission. Heretofore a large shipper of iron or steel or any other commodity has often been able to defeat a proposed advance by getting some one of the competing lines interested to stand by him by maintaining the old rate. The new rate would fail if any one road decided not to file the proposed advance with the commission, unanimous agreement by the competing lines being necessary. The new method of rate making may prove somewhat bewildering to shippers who rely upon past experience.

Under a plan approved by the commission competitive rates are now filed by joint agents, who represent all the roads in their respective districts. The Hepburn law gives the commission power to prescribe the manner in which a railroad shall "concur" in the through rates of its connecting lines, and the commission has ruled that no through rate can be accepted until all the roads interested have concurred through their agents. Each railroad must give a power of attorney to one agent, through whom all its tariffs and concurrences are filed. The commission has taken the view that it simplifies the rate situation to have all the roads in a district appoint one man as their joint agent. The railroad which has given power of attorney to a joint agent can no longer file tariffs or make rates independent of his authority, as the commission refuses to accept such tariffs. The "pirate" railroad is effectually brought under control by this new system, as it cannot participate in through rates to or from points beyond its own rails, unless it concurs in the harmonious plan which the commission has indorsed to simplify through rates.

The Traffic Manager Should Be Rate Maker.

The tendency of the times is in the direction of taking the rate making power out of the hands of the traffic manager of the railroad. This tendency should be resisted by shippers and every one interested in the development of industries. The broad-minded traffic manager should be the best friend of every industry on his road. His primary duty is to promote tonnage, and he can only do this by making rate adjustments that enable the industry to grow. He is a traffic builder rather than a manager, and the marvelous growth of industries in this country is due in no small measure to the fact that, until the present time, railroad rates as a rule have adjusted themselves automatically to the needs of industries. The railroad builder has performed wonders in leveling mountains and overcoming other natural barriers to trade, but the traffic manager has performed an equally great service to the country in leveling rates. After all, it is not the physical structure of the railroad but the rate that moves business.

Political and financial influences, although antagonistic to each other, are both seeking to destroy this automatic adjustment of transportation cost. A railroad should devote all its energies to the work of carrying freight and passengers. Too many roads are overburdened with sins of the financial world which they are expected to bear, and if they must also carry elections and all the political theories that may confront them the industrial shipper will be unable to get the fair consideration for his interests which he has received in the past.

A Southern Foundry for High Grade Small Castings.—Harry Wallwork & Co., Birmingham, Ala., commenced in May last the manufacture of light and medium sized soft gray iron castings. Mr. Wallwork was for several years one of the managers of the firm of Henry Wallwork & Co., Manchester, England, which was established by his father about 75 years ago. That firm from its beginning secured a high reputation for the production of perfect castings, and this standing it still maintains. In the works at Birmingham Mr. Wallwork is following the same methods for the making of the best possible castings, which have proved so successful at Manchester. The location is considered exceedingly favorable for operating a foundry on this class of work.

The New York Central Lines has signed contracts with the American Locomotive Company for the purchase of 138 locomotives, all of which will be delivered during the summer months. Payment for these locomotives, the cost of which will approximate $2,600,000, will be made in equipment trust bonds which the American Locomotive Company has agreed to accept in lieu of cash. This is the largest order received by locomotive builders for several months. It includes 12 electric engines for use on the New York City terminal.

By an error in the telegraphic transmission the 24-hr. record at the Ensley, Ala., rail mill of the Tennessee Coal, Iron & Railroad Company was given in our issue of March 19 as 1525 tons. It should have been 1425 tons.

Massachusetts Ball Bearing Exhausters.

In a line of exhausters, examples of which are shown in Fig. 1, now being manufactured by the Massachusetts Fan Company, Watertown, Mass., the wheels are supported on ball bearings of the Chapman double ball type, with single ball races. Case hardened cups are forced into the hanger and case hardened cones are forced on tapered parts of the fan shaft, as may be seen in Fig. 2. Between the two run hardened steel balls separated by small ball idlers carried in light steel floats, as plainly shown in Fig. 3. The function of these floats is to keep the idler centers in line with the centers of the adjacent larger balls. These idler balls rotate in the opposite direction from that of the load balls, thus eliminating the destructive grinding action of the latter. The shaft may be readily driven out through the fan wheel, pulley and bearings, easily breaking the taper contact between the shaft and inner sleeve. The bearings are packed in vaseline when shipped from the factory and require no attention except repacking about every six months. To detect any defective parts each bearing is subjected to severe running load tests under pressures measured in tons. Such bearings have been run for months under various conditions without showing wear or deterioration.

This type of fan possesses many advantages over older forms. In the smaller sizes the bearing supports form a part of the hanger, making a very compact and rigid combination, while insuring alignment of the fan shaft. Freedom from the necessity and expense of oiling is also secured. Such fans may be placed in unprotected places without collecting dirt and dust, due to escaping oil. Journal friction has been almost entirely eliminated. If necessary the different parts of the bearing may be readily dissembled for inspection or replacement. The smaller sizes are made so they may be set to discharge in any direction. The purchase of a new fan or even a change of hanger is thus obviated. These fans may be made either right or left hand or inverted without reference to the bearings, for which special oiling arrangements would be required in other types. The same hanger is used on both single and double exhausters.

Comparative tests indicate the superiority of the ball bearing fan over one fitted with plain babbitted bearings. A summary of such tests shows a decrease of about 10 per cent. in the power required below that necessary with the older type. Curves of the tests are given in Fig. 4. To provide against misleading results in these tests both fans were previously run for several weeks, so that they represented ordinary conditions. Such economy in favor of the ball bearing fan shows an approximate annual saving of 25 per cent. of the purchase price of the fan.

The convertable type, with bearings formed in the hanger and with overhung wheel, is made in sizes up to and including 60 in. in diameter of shell. In larger sizes the ordinary form of casing construction is employed and the bearings are of necessity constructed as independent boxes to be bolted on to the supports. In the larger fans the bearings each contain two ball races instead of one, as in the case of the smaller sizes. Two case hardened cups are forced back to back into a circular containing

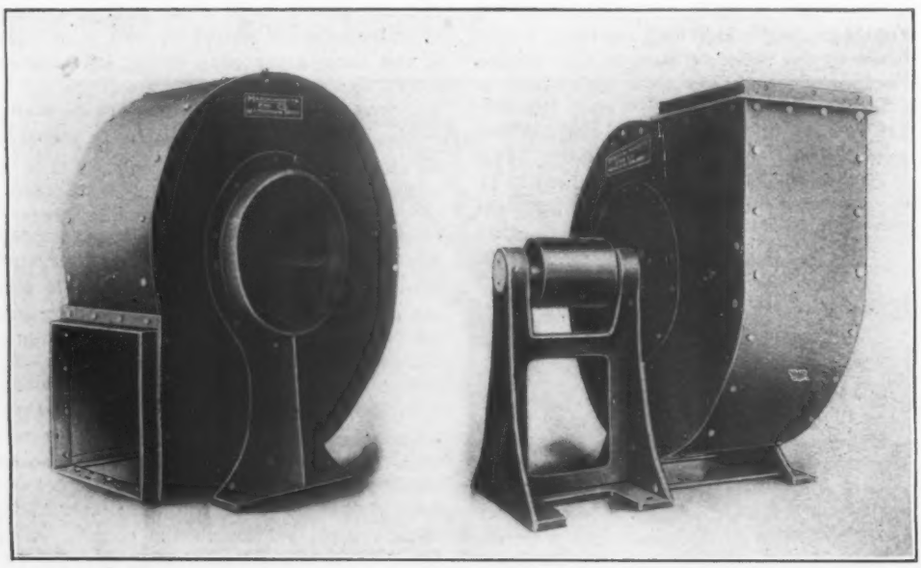


Fig. 1.—Two Settings of the Convertible Ball Bearing Exhauster Built by the Massachusetts Fan Company, Watertown, Mass.

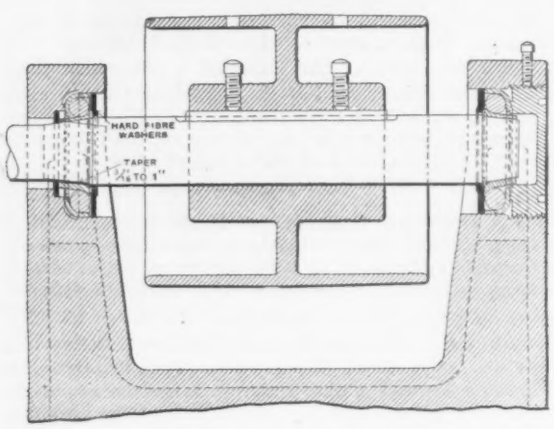


Fig. 2.—Vertical Longitudinal Section Through the Driving Pulley and Ball Bearings.

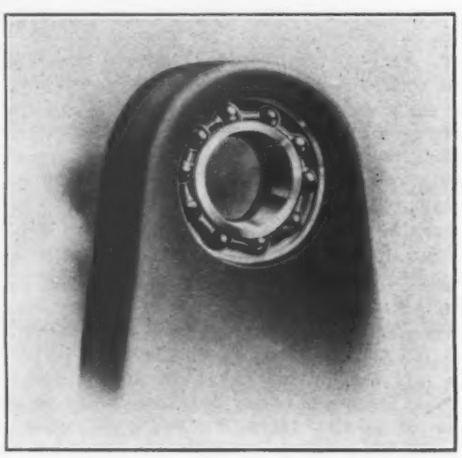


Fig. 3.—End View of a Bearing with the Ball Races Exposed.

ring; a sleeve is placed at the middle, upon each end of which is forced a case hardened cone. The whole, including balls, is held on pivot centers of the ball and socket type, by which self-alignment is secured. The bearings, each of which is entirely independent of the fan, are bolted to cross bars, supported by angle iron uprights, both securely riveted to the fan sheet. The fan shaft is slipped through the sleeve.

In both types the balls are protected from dust by easily removable washers. There is no leakage of oil, no pollution of air by odors of heated oil and no soiling of

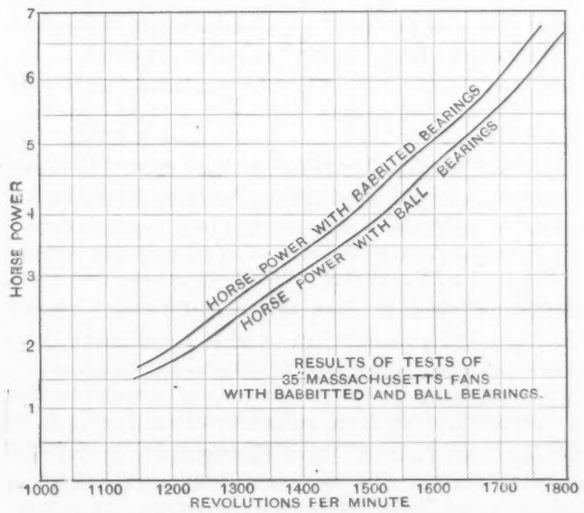


Fig. 4.—Curves from Comparative Tests of Ball Bearing and Babbitted Bearing Fans.

surfaces with which the oil may come in contact. The fire risk incident to dripping bearings and collected lint is eliminated. The fact that a well tried type of bearing of established standing has been adopted insures freedom from the troubles often common to the somewhat experimental stage of development of a new design.

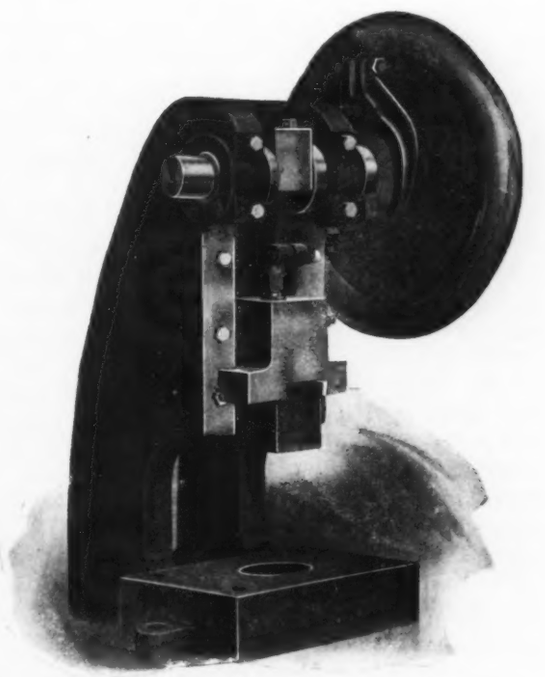
A New Measuring or Lineal Counter.—The C. J. Root Company, Bristol, Conn., manufacturer of counters, has brought out a new type of the instrument known as a measuring or lineal counter, the function of which is to measure and compute the output of a machine by feet or yards. It has neither lever, key nor springs, being run by gears entirely, the figures moving at the proper time. A shaft extends through the back on the right hand side, connecting with a roll for measuring cloth, paper, wire or other product. The roll is designed to be attached to the shaft, a foot or yard in circumference, as the standard of measurement requires. The device counts to 1,000,000. Its dimensions are 9½ in. long, 2¾ in. wide and 1¾ in. thick. The figures are ⅝ in. high. Its shipping weight is 6 lb.

The Westinghouse Air Brake Company has within the last three years completed the development of an entirely new type of brake for freight, passenger and locomotive service which has proved so successful that many of the larger railroads have not only adopted it, but made it standard in all their rolling stock. This new brake can stop a freight train of 100 cars as quickly as the old form of brake would stop a 50-car train. At the works of the company in Wilmerding, Pa., a number of extensive improvements, which were made necessary to facilitate the manufacture of the company's increasing product, have lately been completed. The company is therefore in a better condition than ever to cope with the demand made upon its manufacturing capacity. When the railroads are again ready to extend their operative facilities, which must surely occur, this plant will be in good condition to render prompt service.

The United States steel derelict destroyer Seneca was successfully launched at the yards of the Newport News Shipbuilding & Dry Dock Company March 18. It is the first craft of that type ever constructed anywhere in the world, and was specially designed by the engineers of the revenue cutter service. The vessel will be completed in July, and its mission will be to patrol the north Atlantic coast and destroy derelicts and other wreckage.

A New Atlas Power Press.

The power press shown in the illustration is built by the Atlas Machine Company, Waterbury, Conn., and is designed to take the place of the ordinary foot press, in doing light blanking, perforating, riveting, forming and closing. Its clutch mechanism is so designed that but one revolution of the shaft can be made for each depression of the treadle, the clutch being of the standard Johnson type usually employed for this purpose. The frame is of the open back type, heavily ribbed to secure ample rigidity. The gate is long, with standard V-shaped ways, well gibbed to secure alignment of the punch and dies. A downward adjustment of 1½ in. is provided by means of a clamp sleeve and a screw connection of the



The No. 1 Bench Power Press Built by the Atlas Machine Company, Waterbury, Conn.

ball and socket type, the ball and socket being set in the gate. The gate is finished plain, or with projections for stripper attachment, as shown in the engraving. It is also furnished with dovetailed punch block.

The shaft is turned from solid stock and is made large and long in its bearings, and is extended beyond the left hand side of frame to drive the slide, feed and knockout attachment. The front of the bed is machined so that attachments may be put on when desired. The machine is furnished with the ordinary balance wheel, turned to serve as the pulley, or with rounded hand wheel, as shown, with a 9-in. pulley cast on its side, this being the type which the company regularly furnishes unless otherwise specified.

The press is built in two sizes, known as the No. 1 and No. 2. The former has a hight from the bed to the gate in its lowest position of 6 in., a stroke of 1½ in., a distance between uprights of 3⅝ in., a bed surface of 7⅝ x 10 in, and an opening in bed of 3 in. The flywheel weighs 60 lb., and the press complete 265 lb. In the No. 2 machine the hight from the bed to the gate is 7 in., the stroke 1½ in., the distance between the uprights 6 in., the bed surface 8¼ x 12 in., the opening in bed 3 in., and the weight of the wheel is 60 lb., and that of the press complete 325 lb. The speed for both sizes is 250 rev. per min.

THE IRON AGE

Established in 1855.

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CHARLES KIRCHHOFF,
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RICHARD R. WILLIAMS, - - - - - - - HARDWARE EDITOR.

Canadian Politicians and Canadian Limitations.

Canadians would be saved much perturbation due to the excessive zeal of the propagandists of the "made in Canada" movement, if those who make or lead public sentiment would but master the broad facts of industrial economy and become acquainted with the limitations as well as the capabilities of the existing iron and steel plants in the Dominion.

Parliament at Ottawa has recently been in a commotion over the fact that the steel for the barrels of the rifles made at the Ross factory in the city of Quebec is imported from Pittsburgh, and that the drop forgings are imported from Hartford. The Government insisted on a rifle for the Dominion militia, which should be made in Canada. As far as was practicable, the Ross factory lived up to the conditions of this "made in Canada" contract; yet notwithstanding that the Department of Trade and Commerce is paying out bounties to the amount of $2,500,000 a year to the iron and steel plants of Nova Scotia and Ontario, the fact does not seem to have been known at Ottawa that there is not a plant capable of making steel for rifle barrels anywhere within the Dominion. Had this been generally known, there could have been no commotion over the Ross rifle.

About the same time that Ottawa, Montreal and Quebec were in a newspaper provoked hysteria over the importation of American crucible steel and drop forgings, it was discovered at Windsor, Ontario, that the steel that is going into the international tunnel under the Detroit River is from American plants. There was immediately a "made in Canada" flare up at Windsor. Telegraphic connection between Windsor and Toronto is good. Night press tolls over the telegraph wires are low. Accordingly, the hysterics at Windsor spread as quick as lightning eastward to Toronto, and went on eastward to Ottawa, where, like the "made in Canada" commotion over the American made parts of the Ross rifle, it eventually flickered out. Had there been a news editor in the Toronto daily paper offices who was acquainted with the fact that there is not a plant in Canada at which structural steel of the size and weight necessary for the Detroit tunnel can be made, the scare would have stopped at Windsor.

Only a few days before the Ross rifle commotion the House of Commons gave up a night to discussing the imperative need for tonnage bonuses for Canadian shipbuilders, and filled up an issue of Hansard with "made in Canada," and otherwise patriotic talk of the hardships of Ontario shipbuilders, who are only partially within the tariff breastworks, and who at that time were not on the Government bounty schedules. All the talk was of the capabilities of "iron" shipyards on the Ontario shores of the lakes, and not a man among the whole crowd of politicians seemed to be aware of the fact that iron ships are long ago of the past; that Canadian shipyards never went through the iron stage, and that iron ships never have been and never will be built in Canada.

Eight or nine years ago four large blast furnaces were built at Sydney, Cape Breton, and by the summer of 1905 a rolling mill for the manufacture of steel rails had been added. The story of the plant at Sydney was widely published; for the plant is a political one, and the bounty enactments and the tariff were amended in the interest of the rail mill there. Notwithstanding the nature of the plant, the municipality of Sydney concluded that a steel shipyard was a necessary adjunct of a mill, like that which was to be built, and long before the four furnaces were in blast it was out with an offer of a heavy bonus to secure the establishment of such a yard on the shores of the harbor. The popular idea was that structural steel and ship plates were to be produced by the Sydney rail mill, and that it was contrary to the "made in Canada" idea to allow this material to be shipped elsewhere. This popular idea of what a steel plant could be made to do quickly spread to the Provincial Legislature at Halifax and to the municipal councils of that city and Dartmouth, a city on the other side of the harbor from Halifax. All three of these representative bodies, actuated by the "made in Canada" sentiment, pooled their treasuries, with the result that for three years there has been a free location, an exemption from taxation and $300,000 of Provincial and municipal money awaiting a promoter who will bring about the installation of a steel shipbuilding plant at Dartmouth. The foundation for the project was that, as Nova Scotia had blast furnaces and a rail mill, if a shipyard was established at Dartmouth it would only be necessary for its superintendent to telephone to Sydney for whatever he might require for ship construction.

The "made in Canada" propaganda, now of seven years' standing, and a valuable political asset as far as Canadian manufacturers are concerned, like the immigration propaganda, is never permitted to flag. It keeps the press and the politicians of the Dominion keyed up and in a highly excitable condition. There can be no end to the frequently recurring commotions and the worry they inflict on the politicians at Ottawa, until a few of the politicians and daily newspaper editors in the Dominion make themselves acquainted with the fact that while at this stage of Canadian industrial development there are some things that Canada can do, some for the present must be done elsewhere. The Government at Ottawa is doing much for the iron and steel industry. It has bestowed $12,000,000 or $14,000,000 on the industry in direct gifts, to say nothing of the concessions made in the Dominion tariff. It would do something for industrial education in Canada, and incidentally would add to the peace of mind of the politicians and editorial writers, if it were to ascertain what Canadian plants in this year 1908 are doing and where their limitations begin.

Passenger Earnings Constitute a Railroad Problem.

The detailed statistics given in the annual report of the Interstate Commerce Commission afford quite a measure of explanation of the causes which have led to the situation of unrest in railroad circles. They illustrate quite forcibly what an unpleasant position the railroads

have been placed in by adverse State legislation upon passenger rates; how great has been the promise of reward to railroads through the enormous increase there has been in their business, and how little they have been able to get out of this increase. Herewith are given statistics covering 11 years, ending with the fiscal year 1906, so that comparisons can be made between years separated by a decade. A comparison of earnings and results in this period is as follows:

	1896.	1906.
Gross earnings from operation	$1,150,169,376	$2,325,765,167
Operating expenses	772,989,044	1,536,877,271
Income from operation	$377,180,332	$788,887,896
Income from other sources	129,024,731	256,639,591
Total income	$506,205,063	$1,045,527,487
Total deductions	416,573,137	660,341,159
Net income	$89,631,926	$385,186,328
Total dividends	88,097,757	272,851,567
Surplus	$1,534,169	$112,334,761

The earnings, expenses and total income showed a uniform doubling in the 10 years. The deductions, including interest, &c., of course did not double, thus permitting a tripling in dividends and the passing of a moderate amount to surplus instead of the negligible amount so passed in 1896.

The results shown above have of course been satisfactory to the railroads. An analysis of the means by which they have been achieved is much less satisfactory when the strenuous efforts lately made to hamper the passenger earnings are considered. The cost of labor and supplies has enormously increased, and the much higher standard of equipment and roadway now required greatly increases, in its turn, the necessary expenditures. To meet these much heavier expenditures the railroads have been able to increase the efficiency of the freight department as a means to greater earnings, but have not been able to increase the efficiency of the passenger department. The movement is clearly shown in the accompanying tables:

Passenger Statistics.

Years.	Passenger miles. (Millions.)	Passengers per train.	Revenue per passenger mile. (Cents.)
1896	13,049	39	2.019
1897	12,257	37	2.022
1898	13,380	39	1.973
1899	14,591	41	1.978
1900	16,038	41	2.003
1901	17,354	42	2.013
1902	19,690	45	1.986
1903	20,916	46	2.006
1904	21,923	46	2.006
1905	23,800	48	1.962
1906	25,167	49	2.003

Freight Statistics.

Years.	Ton miles. (Millions.)	Tons per train.	Revenue per ton mile. (Cents.)
1896	95,328	199	0.806
1897	95,139	205	0.798
1898	114,078	226	0.753
1899	123,667	244	0.724
1900	141,597	271	0.729
1901	147,077	281	0.750
1902	157,289	296	0.757
1903	173,221	311	0.763
1904	174,522	308	0.780
1905	186,463	322	0.766
1906	215,878	344	0.748

Percentage of Operating Expenses to Operating Income.

Years.	Per cent.	Years.	Per cent.
1896	67.20	1902	64.00
1897	67.06	1903	66.16
1898	65.58	1904	67.79
1899	60.24	1905	66.78
1900	64.05	1906	66.08
1901	64.85		

Train Mile Revenue, and Cost.

	1896.	1906.
Revenue per passenger train mile	$0.986	$1.203
Revenue per freight train mile	1.633	2.608
Revenue per train mile	1.396	2.075
Cost per train mile	0.938	1.371

The average freight rate, as thus shown, has been reduced slightly, but the average train load has been increased in 11 years by 73 per cent., from 199 tons in 1896 to 344 tons in 1906. Thereby, despite the slight decrease in freight rates, the revenue per freight train mile has increased by 60 per cent. In passenger traffic quite a different result is shown. It has not been possible to load the passenger trains; the average number of passengers per train increased only from 39 in 1896 to 49 in 1906, or 25 per cent., and on account of a slight decrease in passenger rates the revenue per passenger train mile increased only 22 per cent.

Unfortunately it is impossible to know what the cost of operating passenger trains has been. The commission does not present statistics, doubtless because there is no satisfactory method of compiling them, but common judgment would certainly be that by reason of higher speeds, higher costs of labor and supplies, better equipment and the necessity of maintaining better roadways, the cost of operating passenger trains has increased much more than 22 per cent. in 11 years.

Thus the freight operations of the railroads have been made to carry an increasingly improper proportion of the expenses of operation and maintenance. The speed and load of the freight trains are subject to the dictation of the management; the speed and load of the passenger trains are not subject to the dictation of the management, by reason of competition and the popular demand for quick and convenient transportation.

Greatly increased earnings would naturally be expected from the enormous increase in business, which is shown by these statistics. From 1896 to 1906 the tonnage of freight carried 1 mile increased from 95,328,000,000 to 215,878,000,000, or 126 per cent.; passengers carried 1 mile increased from 13,049,000,000 to 25,167,000,000, or 93 per cent. While there was an excellent increase in both directions, the increase in freight business was considerably greater than the increase in passenger business. On account, however, of the fact that freight trains are carrying much greater loads by 60 per cent., while passenger trains are carrying only 25 per cent. greater loads, the number of passenger trains has increased more rapidly than the number of freight trains. Obviously, this is an unfavorable trend; if continued indefinitely it would lead to a domination by the passenger trains, whereas the proportion of total earnings derived from passenger traffic is constantly decreasing. The statistics are perfectly clear in showing that this trend exists in a marked degree.

In 1896 the passenger earnings were 34.3 per cent. of the freight earnings; in 1906 they were only 31.2 per cent. of the freight earnings. In 1896 the passenger train mileage was 69.4 per cent. of the freight train mileage; in 1906 it was 80.6 per cent. of the freight train mileage. Probably it is perfectly safe to say that this phase of the railroad matter has been given no distinct consideration by the legislators who have striven to "regulate" the railroads. A problem is presented to the railroads which they have been anxious to work out by relegating the freight and passenger business to separate tracks, by endeavoring to carry more passengers per train and by other means. The public should recognize that the railroads are confronted by a serious problem in contending with this trend, and some latitude should be afforded for its solution.

The proposed modification of the Sherman antitrust law is in accordance with the desire of important business interests. The law is too sweeping in its scope, which is probably the reason why it has never been en-

forced very thoroughly. Even those whose interests might have been benefited to some extent by such action have hesitated to invoke its provisions against manufacturers known to be maintaining agreed prices. Amendatory legislation, however, will not have a smooth passage, but is likely to be bitterly opposed at every step by members of Congress who would even go further in restrictive measures.

The Parity of the Open Hearth and Converter.

Two features of steel trade history for 1907 are given prominence in statistics published in the past week. The returns made by manufacturers to the American Iron and Steel Association show, in the first place, that open hearth steel production in the United States has practically reached a footing of equality in volume with Bessemer steel. In the second place, these figures, with those the United States Steel Corporation has just given out, tell of a further decline in the corporation's percentage of the country's total output of steel.

We have already given the exhibit of the Bessemer steel industry for 1907, showing a falling off of over 600,000 tons from the product of 1906. Elsewhere is given that for the open hearth works of the country, adding another to the unbroken series of years in which the open hearth steel output has increased. At 11,549,088 gross tons in 1907, open hearth steel production advanced to within 118,000 tons of Bessemer, and raised its own high record, that of 1906, by more than 568,000 tons. In the table below the interesting fact is brought out that while the United States Steel Corporation is responsible for more than five-sixths of the falling off in Bessemer steel last year, it is to be credited with little more than one-sixth of the gain in open hearth steel. The figures show the relative production of the two kinds of steel by the country and the Steel Corporation in the two years and are in gross tons:

	Total.	Steel Corporation.
Bessemer, 1907	11,667,549	7,556,460
Bessemer, 1906	12,275,830	8,072,655
Open hearth, 1907	11,549,088	5,543,088
Open hearth, 1906	10,980,413	5,438,494
Decrease Bessemer	608,281	516,195
Increase open hearth	568,675	104,594

The uninterrupted decline in the Steel Corporation's share of the Bessemer steel of the country and the less accentuated decline in its open hearth percentage appear below. The Bessemer decline of 9 per cent. in five years is striking:

The Steel Corporation's Percentage of Bessemer and Open Hearth Ingots and Castings.

	Percentage of Bessemer.	Percentage of open hearth.
1902	73.9	52.4
1903	72	51
1904	69	50.4
1905	67.4	51.4
1906	65.7	49.5
1907	64.8	48

It is noteworthy that the Bessemer falling off last year from 1906, for the whole country, and the open hearth increase upon 1906 is 5 per cent. in both cases. The total of Bessemer and open hearth steel in 1906 was 23,256,243 tons; for 1907 it was 23,216,637 tons. The crucible steel production, with that of minor processes, amounted in 1906 to 141,893 tons; the total for 1907 will probably not be far from that amount.

Were 1908 a normal year we might now predict that open hearth steel production, on the showing of last year and the known tendencies, would pass that of Bessemer. We may look for a heavy falling off in Bessemer rail production—that much is certain. But the other lines calling for Bessemer steel—wire, sheets, tin plates, wrought pipe and bars—are now and promise to continue more active than plates and structural material, which are the mainstay of the open hearth steel manufacturers. Open hearth steel rails will make a new record this year, but it will be far from compensating for the great falling off in other forms of finished material.

CORRESPONDENCE.

New York Metal Exchange Quotations.

To the Editor: The New York Metal Exchange is the only exchange in these United States designed to facilitate the buying and selling of those most important factors of our country's wealth—the metals. It was chartered under the laws of the State of New York in the year 1883, and its plan of organization states:

> The objects for which said corporation is formed are to foster trade and commerce, to protect it from unjust or unlawful transactions, to reform abuses in trade, to diffuse accurate and reliable information among its members as to the standing of merchants and other matters, to produce uniformity and certainty in the customs and usages of trade, to settle differences between its members, and to promote a more enlarged and friendly intercourse between merchants.

During the 10 years prior to 1897 transactions in tin, lead, spelter or copper were of daily occurrence. In 1887 and later the transactions in copper were of so considerable a magnitude that important banking houses and prominent members of other New York exchanges joined the New York Metal Exchange, and some of these were daily represented upon the floor of that institution. The official quotations issued by the exchange in those days were based upon the actual price of metal as evidenced by sales on the floor of the exchange or were determined and fixed by the rules of the exchange at a fair medium between the bid and asked price made by members actually attending the daily calls and personally and visibly making such bids or offers. Thus the "official quotations" gradually grew to mean something—to producer, to consumer, to those dealing in metals and to those bankers or institutions whose business was the advancement of money on metals.

Later, and more recently, very considerable copper producing interests in this and neighboring countries based the price of raw copper which they delivered to important smelting interests for refining and sale by such smelting interests upon the "official quotations" of the New York Metal Exchange. Later, contracts were entered into by such producing interests by which they obligated themselves, in some instances for a period of years, to deliver to certain smelting interests fixed quantities of ore bullion matte or raw copper, which was to be paid for on a basis of the official quotation of copper on the day the unrefined copper was shipped from the producer, or on the day it arrived at the buyer's works. When it is remembered that such shipments are of daily occurrence, that their volume is not defined by tons, but by thousands of tons; that a fluctuation of one-eighth of 1 cent means a difference of $2.50 on every ton, we can readily see that the absolute fairness of the official quotation is vital to the integrity of the Metal Exchange. Since the New York Metal Exchange is the only body in the United States having for an object the regulation of rules and methods of trading in metals, any stigma which may rightfully or wrongfully attach to its methods, be it uncorrected, becomes a national disgrace.

In 1897 the majority of the present incumbents became officers of the New York Metal Exchange, and with some unimportant changes have since so continued. The president of the exchange then elected was Robert M. Thompson. In his inaugural address to the members he dwelt with particular fervor upon the national importance of America as a copper producer; he alluded to the fact that the transactions in this metal on the London Metal Exchange were of enormous volume; he criticised the fact that although England's place as a copper producer was insignificant, her supremacy, obtained through such enormous transactions on the London Metal Exchange, was unquestioned; and, finally, he promised that

through his influence the New York Metal Exchange should wrest this supremacy from London and place it where it belonged, on the metal exchange of the leading producing country of the world. That president has since continued to be annually elected, although he has never again favored the members of the New York Metal Exchange with his presence at any meeting of its members.

In 1902 the method of producing the official quotations of the New York Metal Exchange suffered a radical change. Instead of the average between bid and asked prices actually made on the floor of the exchange determining the official price of the day, a committee was appointed, consisting of three members of the exchange, whose duty it was to daily meet and issue a so-called "official quotation." Every member of that committee was vitally interested in copper, either as buyer or seller. But one member of that committee, except on the most exceptional occasions, has ever appeared on the floor of the Metal Exchange on call time.

Frequently the prices actually bid for copper on the floor have been considerably higher than the highest or supposedly asked price fixed on the same day by the committee. On several occasions members of the exchange have in writing lodged complaints against such glaring discrepancies between the actual bid and asked prices and the "official quotation" made for the same day by the committee. No attention apparently was paid to such written complaints, and they were not even deemed worthy of a reply.

The members of the exchange who are now endeavoring to institute reforms contend that if there is to be an official quotation there is only one absolutely fair method of producing it; that is, by quoting a medium or average of the price at which the metal so quoted is bid for and offered at on the daily call on the floor of the Metal Exchange.

It is contended by those in opposition that there is no copper business on the floor of the exchange. Granted. But if these official quotations are not obtained as a result of the equilibrium obtained by the contending forces of buyer and seller, then there should be no official quotation, and if the rule is once established that such contending forces must establish the official quotations, I hold that those forces will, as in former times and upon other exchanges, quickly seize upon a method and produce a result for which, and only for which, the Metal Exchange has the right of existence. JAMES E. POPE.

NEW YORK, March 23, 1908.

Open Hearth Steel Production in 1907.

The American Iron and Steel Association has collected the statistics of the production of open hearth steel ingots and castings in the United States in 1907. The total was 11,549,088 gross tons, against 10,980,413 tons in 1906, an increase of 568,675 tons, or over 5.1 per cent. The production was larger than in any preceding year, and was only 118,461 tons less than the production of 11,667,549 tons of Bessemer steel ingots and castings in the same year. The year of next largest production of open hearth steel was 1906. When the collection of the statistics of crucible and miscellaneous steel ingots and castings is completed it will be found that the total production of all kinds of steel ingots and castings in this country in 1907 approximated 23,360,000 gross tons, as compared with an ascertained production in 1906 of 23,398,136 tons. The following table gives the production of open hearth steel ingots and castings by States since 1904 in gross tons:

States.—Gross tons.	1904.	1905.	1906.	1907.
New England	195,901	239,282	251,047	239,797
New York and New Jersey	165,986	348,072	553,186	706,019
Pennsylvania	4,306,498	6,471,818	7,718,213	7,867,705
Illinois	358,215	617,625	884,472	1,013,251
Ohio	480,906	687,392	818,683	819,642
Other States	400,660	607,187	754,812	902,674
Totals	5,908,166	8,971,376	10,980,413	11,549,088

Basic and Acid Steel.

A total of 10,279,315 tons of open hearth steel was made by the basic process in 1907 and 1,269,773 tons by the acid process, while in 1906 the production by the basic process amounted to 9,658,760 tons and by the acid process to 1,321,653 tons. This is a gain in production in 1907 over 1906 by the basic process of 620,555 tons, but a loss by the acid process of 51,880 tons. In 1905 there was made 7,815,728 tons of open hearth steel by the basic and 1,155,648 tons by the acid process.

The following table gives the production by States of both basic and acid open hearth steel ingots and castings in 1907. Pennsylvania made over 66.4 per cent. of the total production of basic steel ingots and castings in 1907 and over 82 per cent. of the total production of acid steel ingots and castings, against 68.4 per cent. of basic and over 83.3 per cent. of acid ingots and castings in 1906. Illinois, Ohio and New York were the next largest producers of open hearth steel in each of these two years:

States.—Gross tons.	Basic open hearth steel.	Acid open hearth steel.	Totals. Gross tons.
New England	172,960	66,837	239,797
New York and New Jersey	665,474	40,545	706,019
Pennsylvania	6,826,479	1,041,226	7,867,705
Illinois	1,006,589	6,662	1,013,251
Ohio	758,401	61,241	819,642
Other States	849,412	53,262	902,674
Totals	10,279,315	1,269,773	11,549,088

Ingots and Castings.

The production of open hearth steel ingots in 1907, excluding castings, amounted to 10,803,211 tons, against 10,260,522 tons in 1906, an increase of 542,689 tons, or over 5.2 per cent. The production of castings alone in 1907 amounted to 745,877 tons, against 719,891 tons in 1906, an increase of 25,986 tons, or over 3.6 per cent. The following table gives in gross tons the production of basic and acid open hearth steel ingots in 1907 by States:

States.—Gross tons.	Basic ingots.	Acid ingots.	Total. Gross tons.
New England, New York and New Jersey	782,325	63,282	845,607
Pennsylvania	6,766,950	792,471	7,559,421
Illinois, Ohio and other States	2,363,564	34,619	2,398,183
Totals	9,912,839	890,372	10,803,211

The production of open hearth steel castings last year —745,877 tons, as compared with 719,891 tons in 1906— was the largest in our history. The year of next largest production was 1906. Of the 1907 production, 379,401 tons, or almost 51 per cent., was made by the acid process and 366,476 tons, or over 49 per cent., by the basic process. As compared with 1906, when 406,343 tons of castings was made by the acid process, the decrease in 1907 by this process was 26,942 tons. Of basic castings the increase was 52,928 tons, the production by this process in 1906 having amounted to 313,548 tons. The following table gives the production of open hearth steel castings by both the basic and acid processes in 1907 by States, in gross tons:

States.—Gross tons.	Basic castings.	Acid. castings.	Total Gross tons.
New England, New York and New Jersey	56,109	44,100	100,209
Pennsylvania	59,529	248,755	308,284
Illinois, Ohio and other States	250,838	86,546	337,384
Totals	366,476	379,401	745,877

The open hearth steel made in 1907, including both ingots and castings, was produced by 136 works in 20 States and the District of Columbia. The District of Columbia appears among the producers for the first time. One hundred and twenty-five works in 20 States made open hearth steel in 1906 and 111 works in 17 States made open hearth steel in 1905.

The United States Steel Corporation is reported to have the names of 95,000 stockholders on its books to-day, the largest number in its history. It is also estimated that the banking houses, brokers and syndicates whose names appear on the records carry stocks for 30,000 persons in addition to the above number.

The Electro Metallurgical Company will remove its general sales office from Chicago to 79 Wall street, New York, about April 15. This company is the manufacturer of 50 per cent. ferrosilicon and of ferrochrome.

Steel Differences.

BY J. KENT SMITH, PITTSBURGH.

In no other industry has the progress of scientific control been more marked than in the manufacture of steel. It is but a few years, comparatively speaking, since the laboratory became an indispensable feature of the up to date steel mill, and to-day chemical investigation is being increasingly supplemented by many physical instruments, notable among which are the microscope and pyrometer, while systems of dynamic testing, in one or more forms, are in many cases used in addition to the purely static tests registered by the tensile machine. In addition, the great effect on the dynamic attributes of the finished product of such purely mechanical details as temperature of casting and amount and nature of the "work" put on the ingot metal have been dealt with abundantly by many writers. These two latter points too often receive but little consideration in the case of failures, though they may be the responsible ones in many instances.

Chemical Investigation Incomplete.

As regards chemical investigation, the examination is more or less perfunctory, and the so-called "complete analysis" is far from complete, since it takes absolutely no note of the presence or absence of such ingredients in steel as oxygen, nitrogen, &c., which in this respect can only be reckoned as powerful poisons. But even as far as it goes, how seldom is it interpreted with any degree of real insight? Let concrete instances be taken. It is stated frequently that "such and such an amount of sulphur makes steel red short." Now this statement is most misleading. Arnold has shown incontrovertibly that sulphide of manganese is comparatively harmless, and has demonstrated in a most spectacular manner that steel containing nearly ½ of 1 per cent. of sulphur in proper combination with manganese can be rolled into perfect bars, while the presence of a fraction of this amount of sulphur contained as sulphide of iron rendered ingots "rotten," brittle and unworkable when hot; furthermore, that the amount of sulphur required to endow steel with bad properties, the manganese content being constant, is much affected by the content of oxygen and of copper in the metal.

Again, we hear the statement that "such and such a percentage of phosphorus makes steel brittle," the brittleness spoken of being demonstrated by static test. It is worthy of remark here that the absence of brittleness to static test does not invariably imply the slow development of brittleness under repeated strains, stresses, &c.; in other words, it is very necessary to discriminate between the property of brittleness and the very important one of potential brittleness, which latter is responsible for a great proportion of the break downs and failures so disastrous in service.

The Effect of Phosphorus.

Now any such statement as to the effect of phosphorus, like the one as to sulphur, is utterly misleading. To begin with, phosphorus may exist in two totally distinct forms, called by Von Jornstoff "hardening" and "phosphide" phosphorus. Again, brittleness caused by phosphorus is enormously influenced by the amount of silicon, carbon, &c., concomitant with it. Silicon itself, when kept within the comparatively large proportion necessary to influence the cubical crystallization of the ferrite in which it is dissolved, is quite harmless, and even benefits the resultant steel. The writer has most successfully made cold drawn seamless tubes of 0.15 per cent. carbon, and of great purity as to sulphur, phosphorus and oxygen, containing nearly ½ of 1 per cent. of silicon. On the other hand, a friend showed to him a little time ago a piece of basic open hearth steel, very low in carbon and silicon, and containing but a very small amount of nitrogen and oxygen, which, although it carried ¼ of 1 per cent. of phosphorus, could be knotted cold. Any attempt to cold bend steel containing 0.15 per cent. carbon, 0.50 silicon and 0.25 phosphorus, would lead to immediate fracture.

Thus it will be seen that it is not so much the actual amounts of deleterious elements themselves as their relative amount and their state of combination, which strongly influences their effect on normal steel, and this is further modified again by the physical status of those compounds, as to whether they be in eutectoid formation, solid solution, or what not.

Considerations in the Study of Alloy Steels.

Thus to cope with the successful study of alloy steels it is very necessary to consider primarily: 1. The way or ways in which the alloy acts. 2. The proximate as well as the ultimate composition of the alloy.

In no alloy is this of more importance than in the case of vanadium, which acts on steel in at least three totally distinct ways, as described by the writer in many treatises, and which alloy furthermore must be used with a reasonable amount of intelligence on account of its very great avidity for oxygen and of its oxygenated product forming a powerful acid.

In spite of much work in all the directions indicated, many points exist in connection with steel which to date await satisfactory explanation.

It has long been known that steels of the same analysis made by different processes vary considerably in their mechanical properties. No attempt to form any correlation on this point had been made until Prof. F. W. Harbord of London, England, in the latter half of 1907, published carefully observed data on the tensile and hardness investigations of acid Bessemer, basic Bessemer, acid open hearth and basic open hearth steels, without, however, attempting any explanation of the observed phenomena. In the ensuing discussion two suggestions were made: First, that oxidation, and second, that heat of refining, had something to do with the differences. But both suggestions are untenable, at any rate, as forming the basis of complete explanations, in the light of our present knowledge.

Two Important Causes of Difference.

The writer would submit two other possible—and probable—causes of difference: 1. The question of the atmosphere in which the steel was refined. 2. The nature of the slag covering the steel bath, and of the material forming the container of the molten steel, with the consequent extent of such atmosphere being transmitted to the steel bath in radiation or conduction processes.

It is generally admitted that some of the finest possible steels are the product of the coke fired "white" pot. The latter, as has been abundantly shown, is porous to gases, and the atmosphere surrounding the steel must be in this case one of nitrogen and carbonic oxide. The product of a gas fired crucible furnace in which "black lead" pots are used should be identical in nature, provided the analysis of the material coincides.

In the electric furnace a similar atmosphere prevails, and its product is comparable in all ways with the best crucible steel of similar composition, while its units are of much greater dimensions. It is almost entirely a question of this atmosphere that endows the steel made in the electric furnace with such high attributes, which are in no way due to the imparting of any especial virtue by the electricity, *per se*, which is used as a heating agent. It will thus be seen that the electric furnace is preeminently suited to the production of the highest grades of alloy steel, in which it is a *sine qua non* that a most excellent base be used.

For given stiffness with regard to similar composition, the writer would place steels made by different processes in the following order:

1. { Coke fired crucible ("white" or "black lead" pot).
   { Gas fired crucible ("black lead" pot).
   { Electric furnace.
2. Bessemer acid.
3. Bessemer basic.
4. Open hearth acid.
5. Open hearth basic.

While the product of the Tropenas converter, acid lined, very strongly resembles in nature that of the acid Bessemer, it differs from it in some respects. If there is anything in the question of atmosphere, this is exactly as would be expected.

Professor Harbord considers that for rail steel the product of the basic open hearth should contain at least 0.10 per cent. more carbon than that of the acid Bessemer to give the same conditions of wear.

The writer, who is more particularly interested in alloy steels, would naturally draw an illustration from such a source, and would say that, selecting the type A chrome-vanadium (machinery) steel of the American Vanadium Company, the product of the crucible or electric furnace should contain 0.22 to 0.23 per cent. carbon, that of the acid open hearth 0.25 to 0.26 per cent. carbon, and that of the basic open hearth 0.28 to 0.30 per cent. carbon, while other tempering types should vary more or less in proportion with regard to carbon.

This note will demonstrate the extreme inadvisability of submitting a general analytical specification to those manufacturers who use different processes. Either physical results alone or analytical composition coincident with a given process should be specified; otherwise, confusion and dissatisfaction are bound to result.

Tariff Revision Being Planned.

Congressional Leaders Considering the Preliminary Steps.

WASHINGTON, D. C., March 24, 1908.—The movement to lay the foundation at the present session of Congress for the comprehensive revision of the tariff act in the near future is rapidly taking tangible form, and it is now probable that the policy of the majority in Congress will be fully disclosed before adjournment for the summer recess. A resolution authorizing the Ways and Means Committee to hold sessions during the recess, to employ experts and to call upon the executive departments for information and co-operation has been framed by Representative Tawney of Minnesota, who is chairman of the House Committee on Appropriations and the real floor leader of the majority, although that title is usually bestowed upon the chairman of the Ways and Means Committee. The only active opponent who exercises much influence in the House is Representative Dalzell of Pennsylvania, who is a standpatter under all conditions, and who is as yet unconvinced that any action should be taken at this session looking toward the amendment of the tariff. The impression is now very strong that the Tawney resolution will be introduced in a few days, favorably reported from the Ways and Means Committee and passed some days in advance of the recess adjournment.

Object of the Tawney Resolution.

In discussing his plan, Mr. Tawney makes it perfectly clear that he does not anticipate any tariff legislation in the present Congress. He believes that the long recess should be utilized in gathering information regarding industrial conditions in this country and abroad with special reference to labor conditions, relative scales of wages in the leading industries, cost of raw materials, &c. He does not think that the Ways and Means Committee would be called upon to give hearings during the coming recess nor to take any steps which would have a tendency to unsettle industrial conditions in this country. He is firmly of the opinion, however, that the public sentiment in favor of tariff revision is so strong that unless the majority in Congress accords it some such recognition as would be involved in the passage of his resolution, the complexion of the present House may be changed at the elections next November, and the "friends of the tariff" thus be deprived of their last opportunity to revise it for some years to come.

The Metal Schedule Discussed.

Mr. Dalzell is not alone in standing out against the proposed Tawney resolution, and the general debate on current measures is beginning to reflect both sides of the contest. The metal schedule of the Dingley act has been forced to the front in these discussions, and during the past week attention was drawn to the subject in a speech by Representative Bannon of Ohio, one of the leading protectionists of the House. Mr. Bannon is opposed to tariff revision, and believes that the rates of the metal schedule are none too high. In this connection he said:

No schedule in the tariff law is denounced by free traders so vehemently and at the same time so unreasonably as the iron and steel schedule. In the nation this industry has made a most wonderful and marked growth. In 1861, when the Republican party first came into power, we were dependent upon Europe for our iron and steel. We had the ore and we had the coal and the other materials necessary in this industry. By an adherence to our protective policy these plants increased in number and grew in size, so that to-day, instead of being dependent upon Europe for these products, we are ourselves furnishing them to the world. In 1887 our exports of iron and steel products were valued at $16,250,000; in 1897, $63,000,00, and in 1907, $200,000,000. Expressed in percentage for these 20 years it is 1131 per cent. increase. Almost one-half of our iron and steel exports for 1907 was machinery of various kinds.

Our home market is supplied by our home industries, and the tremendous growth of this market is apparent to all. But the great growth of this industry, its marvelous extension and development, of which we are all so proud, has proved to be the source of the attacks made upon it; and because it has been successful it is threatened with the infliction of a penalty by a very material reduction in the duty.

The growth of the production of steel rails is one of the results of the protective system. From an output of 2277 tons in 1867, our production has grown to 3,500,000 tons in 1907. Of our production of rails last year we exported 338,906 tons, or about 10 per cent. Now the fact that this 10 per cent. of steel rails produced in American mills by American workmen, who were paid an American wage, may have been sold abroad for 5 per cent. less than the domestic price is seized upon as a point for attack upon the iron and steel schedule and is urged as a reason why our tariff act should be a revenue measure only and not a protective measure.

In answer to them I would say that the American railroad buys rails from American manufacturers cheaper than the English railroad buys rails from the English manufacturers; cheaper than the German railroad buys from the German manufacturer; cheaper than the French railroad buys from the French manufacturer; cheaper than the Austrian railroad buys from the Austrian manufacturer, and cheaper than the Belgian railroad buys from the Belgian manufacturer.

A Low Export Price Justified.

No manufacturer can calculate with exactness what quantity he can sell in a year or how much he ought to or can produce. The market may be strong or it may be weak. The accumulation of a stock of steel rails is neither practicable nor the exercise of good business judgment, and it is far better that our mills be kept busy on full time, paying the breadwinner of the family good wages and giving him steady employment, than to put out the fires, disorganize and disrupt the force, and deprive the wage earner of his wage. An export discount of 5 per cent. on 10 per cent. of the production—what does it amount to? It does not cripple our railroads; they are not complaining. It does not influence our freight rates; ours are now the lowest in the world. Simply a small surplus is sold abroad. The home market, the home industry and the home wage earner are maintained. Besides, if there is a demand for the entire output for home consumption at $28 per ton is any sensible being justified in presuming that the home market will not be first supplied?

But this question of export discounts has become what the lawyers call *res judicata*. It was submitted to the American people in 1900, again in 1902 and in 1904 and in 1906. The verdict was that there was nothing in it. Out of every $3000 worth of manufactures produced in this country $1 worth is sold abroad at a discount under the domestic price, and it is better to do this and keep our industries busy on full time and our wage earners in steady employment at good wages than to put out the fires, still the hum of industry and deprive our people of work.

An Early Adjournment Probable.

The plans of the majority leaders now contemplate the adjournment of the present session about May 15. The Tawney resolution will not be introduced until every effort to bring the standpatters into line behind it has been exhausted, but the Speaker is said to favor its passage well in advance of adjournment, with a view to avoiding a deadlock in the closing days of the session. For obvious reasons the House leaders would be unwilling to invoke a special order to force the resolution through, as such a procedure would disclose a lack of harmony that, from a political point of view would fully offset the good effect of the preliminary movement for revision. W. L. C.

The Great Northern Ore Output.

DULUTH, MINN., March 20, 1908.—In the report of the Great Northern Ore trustees, made last week, no mention was made of the amount of ore mined for the Steel Corporation for the reason that the corporation did no mining on its Great Northern properties in the year. The 3,307,244 tons of ore mined under the trusteeship—that is, from lands of the Great Northern—was from the Mahoning, Stevenson, Kinney and a 50 per cent. interest in Leetonia.

The Steel Corporation Lease.

At the risk of partial repetition, there will be some figures concerning this lease and its operation that may be given with propriety. The entire trusteeship includes 65,091 acres, of which 39,296 acres are held by the Great Western Mining Company, a subcorporation of the United States Steel Corporation. The remainder is chiefly in the hands of companies operating the mines above mentioned. The lease with the Great Western Company provides for the mining of a minimum amount of 1,500,000 tons during the present year, but it is certain that neither this amount, nor any appreciable quantity, will be actually mined during the year. The Great Western Company, however, will pay its royalties upon this quantity, which will be applicable for ores to be mined in future years, in excess of the minimum for those years. It will be several years, of course, before the Great Western can proceed far enough with its development to mine its minimum and the tonnages for which it has paid, when it was not able to mine the total minimums.

As has been stated, the basic ore under the Steel Corporation lease is 59 per cent. iron, the royalty falling 4.82 cents for each 1 per cent. iron below that standard. As it is fairly safe to assume, from a general knowledge of the qualities of ore contained in these Great Northern lands leased to the Great Western, that the average of such ore, as shown by present explorations, is not in excess of 55 per cent., the actual average royalty will be about 19.25 cents a ton less than the standard rate. This standard rate is 85 cents a ton for the first year, increasing annually by 4 per cent. interest.

The Cost of the Ore at Lower Lake Ports.

There will be ore mined under this lease that will be higher in grade than the standard of 59 per cent., and on this the premium of 4.82 cents a ton will apply. But the minimum grade recognized as minable under this contract is 49 per cent., which would be taken at a royalty rate, for the first year, of 36.80 cents a ton. This, delivered at dock on Lake Superior by the Great Northern Railroad at the customary rail rate of 80 cents a ton from mine to lake, which is provided for in the agreements, would cost the Steel Corporation $1.168 at the head of Lake Superior. With a freight rate of 75 cents a ton to lower lake ports this ore would stand a charge of $1.91 a ton before unloading.

It is a common error of those estimating the receipts to accrue on ore certificates to assume that the certificates receive the entire benefit of the price of this ore, delivered at dock on Lake Superior. This is an inexcusable mistake, for the Great Northern Railroad, carrying the ore under a contract which covers the entire tonnage of these lands, receives the full freight charge of 80 cents a ton, and this is true, not only of the Steel Corporation lease, but of all other leases given by the Great Northern. Indeed, the primary reason for the accumulation of mines which have been leased by the trusteeship was the haulage earnings for the road itself, and any royalty benefits are merely subsequent and incidental, however great they may be.

One provision of the Great Western lease is that, should any ores of lower iron content than 49 per cent. be shipped, they shall pay a royalty of 25 cents flat, plus the freight rate, of course.

The Royalty for 1908 and 1909.

The basic royalty for 1908, being the second year of the term, is 88.4 cents, this being arrived at by adding the annual 4 per cent. interest charge to the original base of 85 cents for standard grade ores. For 1909 the rate will be 91.8 cents, and the total royalty paid by the Great Western Company, estimating all ore to be of the standard, will be $2,065,500. Against this the Great Northern will be obliged to pay out large sums in underlying royalties to fee owners from whom it has leased a very considerable proportion of the lands which it has held. On Mahoning, Stevenson, Kinney and half Leetonia, which it owns outright and has leased to others, there are no underlying royalties. These properties will probably mine less ore in 1908 than they did last year.

The Great Western lease carries provisions as to liens, taxes, minimums, &c., such as are common on the Mesaba range. There are also full provisions for the continued exploration of the Great Western leases, similar to most of those on the Mesaba range, requiring at least five drill holes to each 40-acre tract, and the complete exploration of the entire holdings, with not less than 40 drills continuously worked. This provision is being carried out very satisfactorily, and more than the required number of drills has been steadily employed. It is understood that the corporation has discovered some new ore and has materially enlarged the areas of deposits formerly known.

General Conditions of the Lake Trade.

There is little change in lake freight conditions. A lot of coal has been chartered for up-lake delivery, 600,000 tons by one Duluth agency, 400,000 tons by another and some 2,000,000 tons in all. But there has been no desire on the part of ore shippers to make contracts, and it looks as though the Pittsburgh Steamship Company and its immediate associates would be pretty nearly the whole thing this year in the trade.

The Oliver Iron Mining Company is stripping at the Gilbert mine, Mesaba range, where it commenced operations on surface last spring and mined about 100,000 tons in 1907. It is stripping in two pits, and will mine the deposit by the milling process. Resumption of stripping operations at the Fayal mine will take place at once, and will be continued with one or two shovels. It has been reported that the ore to be moved from the La Rue mine, western Mesaba range, would amount to 1,250,000 tons this year, but this is very much exaggerated. The tonnage to be taken will be small. Last year the mine produced 300,000 tons. Mines of many of the independent companies will produce less ore than last year by 50 per cent.

At Escanaba the Oliver Iron Mining Company is beginning the work of overhauling its large Menominee range ore crushing plant, and will have it ready for operation as early as usual. At Iron Mountain, same range, the cost of maintaining railroad tracks across the Chapin pit, which is continually caving in, was about $60,000 last season, and efforts will be made to so change the alignment there as to avoid the difficulty this season.

The work of diverting the Escanaba River at the Cleveland-Cliffs Company's new mining district of Gwinn, which has been in progress for some months, has been completed, and the river is no longer a danger to mine operations there. The diversion of the Sturgeon River at the Loretto mine is still in progress. D. E. W.

The Detroit Steel Products Company.—The Detroit Steel Products Company, Detroit, Mich., is enlarging its plant to provide room for the installation of machinery to manufacture the Fenestra rolled steel window sash. This sash has hitherto been manufactured abroad, but it is expected that the company will be ready to produce it here in about 60 days. Work on the construction of a large additional building to accommodate the automobile construction department will also be begun immediately. The erection of this building was begun last year, but owing to unfavorable industrial conditions work was suspended; its resumption means the early completion of the plant, which is located on the corner of the Boulevard and Chene street. The building of the forge and car spring department has been completed, and that part of the plant is now in operation in the new building. In this connection, it is stated, that business is more satisfactory, and that specifications are now being placed for several months ahead, which is taken as an indication of increased public confidence.

Bridge and Tunnel Events.

Wednesday, March 18, saw the beginning of the end of two notable engineering undertakings in New York City, the connecting of the last open space in the Blackwell's Island Bridge, and the last of the four Pennsylvania Railroad tunnels under the East River.

In the presence of a party of guests invited by the Pennsylvania Steel Company, the first piece connecting the Queens cantilever span was inserted, completing a continuous line of steel between the Manhattan and Queens anchorages. This member was a 29½ ton steel beam 88 ft. 2¼ in. long, 1 ft. 9⅝ in. wide and 4 ft. ½ in. deep. When it was secured in position wooden platforms and railings were hastily constructed so that the party could pass across. The first over the beam was acting Mayor Sullivan, who broke a bottle of champagne at the middle of the beam and simultaneously a large flag was unfurled, swinging between the two overhanging cantilevers. There were present nearly all the officers of the Pennsylvania Steel Company, which constructed the bridge, among them E. C. Felton, president, J. V. W. Reynders, vice-president, Thomas Earle, superintendent, F. C. Kunz, chief engineer and F. W. Cohen, engineer of erection.

The Iron Age, March 7, 1907, contained a full description of the bridge, but it may be interesting at this time to repeat some of the more important dimensions. Overall it will be 3724½ ft. long. The river span west of the island is 1182 ft. long, and the river span east of the island 984 ft. The clear hight above mean high water is 135 ft., and the greatest width 86 ft. The only bridges of longer single span are the Firth of Forth bridge, the Williamsburg bridge and the Brooklyn bridge, respectively 1710, 1600 and 1595 ft. long. The new bridge will have four elevated railroad tracks, two promenades, four trolley tracks and a general roadway. The maximum live load allowable on the structure will be 16,000 lb. per foot of bridge, or 100 lb. per square foot over the entire area. The approximate dead load of the bridge will be about 120,000,000 lb. The total weight of steel will be about 50,000 tons.

At 8 o'clock Wednesday evening the two crews of workmen in the last of the four Pennsylvania Railroad tunnels between Manhattan and Long Island City met. Superintendent Johnson was the first through the breach, followed by his assistant, Thomas Lynch, and the entire gang of workmen. Late that night the iron plates were placed in position and Vice-President Ernest W. Moir, of the S. Pearson Contracting Company, went through the joined ends of the tube. The last finished tunnel is known as tube A. Tube B, the first of the four to be joined, was connected on Washington's Birthday, and Tubes C and D quickly followed. The four tunnel excavations were begun a little more than two years ago by S. Pearson & Sons, the English firm of contractors. They have finished the work several months within the contract time. The four tubes are 23 ft. in diameter and when the steel casings and concrete lining are installed will be 20 ft. from side to side. A tour of inspection by a party of Pennsylvania Railroad engineers was made last Thursday.

The Westinghouse Machine Company.

An important move looking to the rehabilitation of the Westinghouse Machine Company has been made in the election of the Board of Directors who will have the affairs of the corporation in charge when it is taken out of the hands of receivers. There are a number of new names on the board, among them being John F. Wallace, late chief engineer of the Panama Canal and at present at the head of the Electric Properties Company, with headquarters in New York. The names of the other directors are as follows: George Westinghouse, Pittsburgh; H. H. Westinghouse, New York; Robert Wardrop, president People's National Bank, Pittsburgh; James C. Chaplin, vice-president Colonial Trust Company, Pittsburgh; W. H. Donner, Pittsburgh; William McConway, president McConway-Torley Company, Pittsburgh; Wilson A. Shaw, president Bank of Pittsburgh, and Horace E. Smith, Philadelphia.

The affairs of the corporation are said to be in an extremely satisfactory condition, and the officers are pleased with the outlook. Application will be made in the Federal Court near the close of the month for the discharge of the receivers, and the corporation will be ready to continue its business under the direction of the new board at the beginning of the fiscal year, April 1. The announcement of the new directorate is important from the fact that it shows the confidence displayed by important banking interests in the future of the corporation.

Canadian Vessel Repairs.

TORONTO, March 21, 1908.—Finance Minister Fielding's budget speech, which was delivered on Tuesday, contained no announcement of new customs duties or other fiscal changes. In some quarters hopes were entertained that he would provide for an export duty on pulp wood, but it looks now as if the most to be expected in that behalf is the appointment of a royal commission to make a study of the question and report to Parliament. That course was recommended by the Premier of Quebec in his budget speech of a few days ago. Quebec is the province mainly concerned in the question, and the Quebec government is in party sympathy with the Dominion government.

Notwithstanding that Mr. Fielding's speech made no reference to the subject, ministerial newspapers continue to hold out hopes that something will be done this session for shipbuilding. The Toronto *Globe's* Ottawa correspondent said a short time ago that he understood that the tariff regulations are to be amended in the interest of Canadian shipbuilders. Repairs are now nondutiable, and the *Globe's* information is that they will probably be made dutiable. Canadian vessels may have large sums expended upon them for repairs or improvements made in American yards without incurring any liability to pay duty on the new work when they resume their business between Canadian ports. Second-hand vessels, bought by Canadians at low prices in the United States, are often practically reconstructed and re-equipped before being brought to their Canadian routes. Yet they are dutiable ad valorem on what was paid for the unimproved ship. On the other hand, Canadian shipbuilders have to pay duty on many of the articles they must import as materials of construction. It is not thought so probable that the government will make reductions in the duty on materials as that it will make repairs dutiable.

As was to be expected, the intimation that such a change may be forthcoming is not welcome to the vessel owners, who naturally cling to the advantage of access to American shipyards for repairs, in view of the fact that Canadian repairing facilities are to be found at only two points on the lakes.

It is the desire of the government to have the facilities for building and repairing vessels within the country increased and distributed over the waterways. As far back as 1882 an act to encourage the construction of dry docks was placed on the Dominion statute book. It provided for the payment of a subsidy to the constructing companies. In 1906 the Dry Docks Subsidies act of the Revised Statutes (1906) is the form to which that legislation finally passed.

Mr. Fielding, Minister of Finance, has now before Parliament a measure to take the place of the Dry Docks Subsidies act, which is therefore to be repealed. The new bill provides for the construction of new docks and the extension of old ones. It empowers the Governor in Council to pay a subsidy of 3 per cent. per annum of the cost of such work to the incorporated company by whom t e dock is built or extended. To be eligible for the subsidy the dock must be equipped with all necessary plant and appliances for vessel repairing, and must be approved by the Minister of Public Works. In no case must the subsidy exceed $45,000 per annum for a new dock, or $15,000 per annum for the extending of an old one. The subsidy is to be paid annually for 20 years from the time of completion of the work. If the more liberal terms of the new measure have the effect of in-

creasing the number of Canadian dry docks, existing shipbuilding and repairing companies may not be much better satisfied, unless duties on American repairs to Canadian vessels are adopted.

The Collingwood Shipbuilding Company has 300 hands at work. It has just secured the contract for building a passenger and freight steamship for the Northern Navigation Company, the price to be $500,000. The vessel is to be ready for the water at the opening of navigation on the Upper Lakes in 1909. It is to be 365 ft. long, 50 ft. beam and 27 ft. molded depth.

C. A. C. J.

PERSONAL.

Alex. E. Outerbridge, Jr., of William Sellers & Co., Inc., Philadelphia, has recently returned from a stay in the South, in which he recuperated from a critical illness of many weeks.

A. W. Allen, Pencoyd, Pa.; S. G. Worton, Donora, Pa.; J. A. Nichols, Clairton, Pa., and George L. Danforth, South Chicago, Ill., attended a meeting of the Open Hearth Committee of the United States Steel Corporation subsidiaries at Birmingham, Ala., last week. In the previous week the committee held a meeting at South Chicago.

D. Ralph Day has resigned as secretary of the Northwestern Malleable Iron Company, Milwaukee, Wis., to accept the position of manager of the Union Malleable Iron Company, Moline, Ill.

James H. Baker has opened an office at 316 Fourth avenue, Pittsburgh, Pa., as forging engineer. He will give special attention to forging development, the examination of plants, forging and special machinery, designing forgings and castings, &c. In 1886 he with others organized the Baker Chain & Wagon Iron Mfg. Company, Pittsburgh, and made Baker products which became known throughout the country. This concern finally consolidated with other companies, after which he organized the Baker Forge Company, which developed and made all the forgings for the then rapidly expanding pressed steel car industry. This company was bought later by one of the steel car interests, and is still perhaps the leading forge in this line. Mr. Baker next, with others, organized the James H. Baker Mfg. Company in 1900, which was afterward combined with another forge and named the Solid Steel Tool & Forge Company, from the presidency of which he resigned December 1, 1907, to lay the foundation of a new branch of engineering. He has taken out many patents for improvements in various branches of metal manufacturing.

S. W. Eccles, former traffic manager for the Guggenheim interests, has transferred his activities to the mines and mills. He has been elected a vice-president of both the American Smelting & Refining Company and of the Smelters Securities Company, and will have general charge of the mines and plants of both companies. He has also been elected to vice-presidencies in the Cumberland-Ely Copper Company and the Nevada Consolidated Copper Company. S. W. Sproule, formerly traffic manager of the Southern Pacific, has taken the management of the traffic department of the American Smelting & Refining Company.

Herbert Foster, New Haven, Conn., who has contributed a number of articles on costs and kindred subjects to the columns of *The Iron Age*, has been appointed lecturer on the problems of business management in the Sheffield Scientific School of Yale University.

Anton M. Olsen, an apprentice of the Kempsmith Mfg. Company, builder of milling machines, Milwaukee, Wis., is the first apprentice west of New England to receive the diploma recently adopted by the National Machine Tool Builders' Association to mark the completion of an apprentice's time under the uniform apprenticeship contract. The presentation of the diploma, which took place last week, was made the occasion of an evening luncheon at which were present all the company's apprentices, as well as the superintendent, foremen and executive officers.

John C. Spiers, formerly factory manager for the Autocar Company, has been appointed factory manager of the Standard Roller Bearing Company, Philadelphia, with full charge of the manufacturing department.

The American Society of Mechanical Engineers, 29 West Thirty-ninth street, New York, with the desire to still further develop its publications, has secured Lester G. French to direct its editorial department. Among the immediate improvements to be undertaken is the establishing of departments in the monthly *Proceedings*, thus providing a greater variety of technical articles of interest. All such papers, however, will first be presented and discussed before the society at its meetings, as formerly, thus benefiting the membership twofold. Mr. French received his degree in mechanical engineering from the Massachusetts Institute of Technology in 1891. After four years' apprenticeship, drafting room and shop experience and a year and a half as a text book writer, he was engaged on the editorial staff of *Machinery*, and for nine years was its editor in chief. Recently Mr. French re-engaged in the publishing of text books on algebra and applied mechanics and of a treatise on steam turbines.

J. W. Hemmerle of J. W. Hemmerle & Co., *Times* Building, Pittsburgh, is now connected with Edgar M. Moore & Co., 914 Farmers' Bank Building, manufacturers' agents, in the capacity of salesman. Mr. Hemmerle has been representing the Hawley Down Draft Furnace Company, Chicago, manufacturer of the Schwartz metal melting and refining furnaces, which have been added to Edgar M. Moore & Co.'s regular line. The firm will also hereafter pay special attention to foundry equipment.

Thomas McDonald, general superintendent of the Ohio works of the Carnegie Steel Company, Youngstown, Ohio, has been absent recently on a Venezuelan trip.

Dr. Hugo K. W. Ackermann, one of the engineers of the famous firm of Thyssen & Co., steel makers of Muelheim a. d. Ruhr, Germany, is now visiting this country in behalf of the Walzwerk Dinslaken.

The Du Bois Iron Works, Du Bois, Pa., has appointed as its representative for Cleveland and vicinity Robert R. Harkins, with offices at 1526 Williamson Building, Cleveland, Ohio. Mr. Harkins was formerly Pittsburgh manager for the Atlas Engine Works, and has had extensive experience with steam engines, gas engines and producer gas plants.

Joseph G. Walton, formerly a salesman for the Robert Field Company, Cincinnati, and prior to that connection identified with the Cincinnati office of Matthew Addy & Co. for several years, has taken a position as salesman for Walter Wallingford & Co., with headquarters at the Cincinnati office in the Traction Building.

Mail Subsidy Bill Passes the Senate.—The United States Senate on March 20 passed the Gallinger mail subsidy bill providing that American vessels plying to the Orient and Australasia should receive the same subsidies as those granted to vessels carrying mail in the Atlantic, provided that the total expenditure for foreign mail service in any one year shall not exceed the estimated revenue therefrom for that year. The present ocean mail law gives to 20-knot vessels that cross the Atlantic to European ports $4 a mile for mail service; to 16-knot vessels, for any port, $2 a mile, and to 14-knot vessels, $1 a mile. It was explained that the amount to be appropriated for this service would be $3,600,000 a year for 10 years. This was thought to be sufficient to establish two steamship lines to South America and one to Oriental ports. The estimated revenue from the foreign service is now $6,000,000 a year, from which there is an estimated net profit of $3,600,000. The revenue has been increasing at the rate of $500,000 a year for the last few years.

Work has been pushed actively during the depression on the two new blast furnaces, Nos. 5 and 6, being built by the Carnegie Steel Company at its Ohio Works, Youngstown, Ohio. The construction of the new 12 open hearth furnaces and eight finishing mills was practically stopped some time ago, but orders have recently been given to the different machinery concerns that are supplying equipment to resume work on the contracts.

NEWS OF THE WORKS.

Iron and Steel.

The William B. Pollock Company, Youngstown, Ohio, builder of heavy steel plate work, is forwarding to the Schaghticoke Electric & Power Company, Schaghticoke, N. Y., 750 tons of penstock to be used in the construction of a new plant. The company is dismantling the old Grace stack of the Brier Hill Iron & Coal Company, Youngstown, and is daily shipping material to be used in the construction of the new furnace.

The report that the United States Works of the American Sheet & Tin Plate Company, at Demmler, near McKeesport, Pa., will be dismantled is officially denied. This plant contains 11 hot mills and is one of the best equipped plants owned by the company.

The Standard Steel Tie Company, recently organized under the laws of Delaware with a capital of $133,000, has opened offices at 714-715 Curry Building, Pittsburgh. The company will manufacture Standard steel ties and fasteners for street railway and railroad service. It intends to erect buildings near skelp and plate mills for the manufacture of the new tie and fasteners.

The Carnahan Tin Plate & Sheet Company, Canton, Ohio, reports that it is running its plant at full capacity and that orders are coming in in a very satisfactory manner.

General Machinery.

The American Foundry & Construction Company, Pittsburgh, has plans under way for improvements and additions which will more than double the output of its plant. Contracts have been awarded for the erection of a large steel building, which will contain equipment for bending, welding and cutting pipe, and this also will have an electric crane for handling material. The foundry will also be enlarged. These additions will be completed within three months.

Power Plant Equipment.

The city of Whittier, Cal., is considering the establishment of a municipal electric light plant and a committee has been appointed by the Board of Trade, consisting of N. T. Edwards, C. F. Klingberg and H. E. Humphrey, to investigate the proposition. It is estimated that an installation can be made in connection with the present municipal pumping plant for about $75,000.

The City Council of St. Peter, Minn., has under consideration the question of installing a new generator and engine and making necessary repairs to the power house. No plans or specifications have as yet been prepared.

The New World Reduction & Power Company, Spokane, Wash., has under construction and near completion a 200-ton smelter in Park County, Mont., in the vicinity of the New World and Cook City mining camps. In connection therewith an electric plant of 6000 hp. is being built. All machinery equipment required for the present installation has been purchased.

The Mitchell Illuminating & Power Company, Mitchell, S. D., is contemplating improvements to its plant and system which, according to plans now under consideration, will require the purchase of some new machinery.

The Manistee Light & Traction Company, Manistee, Mich., which has heretofore operated two separate plants, is consolidating them into one. In connection with this work other improvements will also be made.

The Pellston Light & Power Company, Pellston, Mich., has increased its capital stock from $35,000 to $50,000, and expects to begin work about April 1 upon the construction of an additional dam to develop about 1000 hp. A power house will also be built, together with about 20 miles of the transmission line.

The Yorktown Light & Ice Company, Yorktown, Texas, which was recently incorporated with a capital stock of $7500, has purchased of Koenig & Son the local light and ice plant and is preparing to spend a considerable sum on improvements.

Plans are being prepared for the enlargement of the city water works, Centralia, Ill. Among the improvements contemplated are the purchase of new pumps and the building of a reservoir, but until plans are completed details of requirements cannot be supplied.

The Entiat Power Company, Seattle, Wash., has been incorporated, with a capital stock of $200,000, to develop a water power of 2000 hp. capacity and transmit current 20 miles along the Columbia River for furnishing power and water for irrigation purposes. Rights have been secured for a flume line 1½ miles long. No machinery has yet been purchased. Among those interested in this project are M. D. Barash, J. H. Allen and A. B. Gray.

E. R. Cushman, Viola, Wis., is contemplating the erection of an electric light and power plant at that place, for which plans are being prepared. The estimated cost of this improvement is from $15,000 to $20,000.

The Gulfport & Mississippi Coast Traction Company, Gulfport, Miss., will spend $120,000 for new machinery to increase the capacity of its power plant, the installation to include a 500-kw. Westinghouse turbo generator, 445-hp. Babcock & Wilcox boiler, Worthington condenser and accessories.

The Board of Commissioners of Dallas, Texas, has accepted the bid of the Wm. Todd Company, Youngstown, Ohio, for furnishing the high service pumping engine for the city water works. The engine will cost $64,500.

The City Clerk of Council Bluffs, Iowa, will receive bids until May 18 for a water works system under four separate divisions, as follows: Division 1, power plant complete; 2, settling reservoir; 3, distribution system; 4, high service reservoir.

E. G. Whitacre, Wellsville, Ohio, has sold his boiler works to Joseph and J. W. D. Noon and other Pittsburgh capitalists for $30,000. The new owners will take charge at once, and it is understood to be their intention to enlarge the capacity.

The Dittlinger Lime Company, New Braunfels, Texas, has purchased a Bullock generator and other necessary equipment for the installation of an electric light plant in its factory and grounds.

Foundries.

The large stove plant of the H. Wetter Mfg. Company at South Pittsburg, Tenn., has again started up. It is reported that the Shuster plant of the Central Foundry Company, in the same town, will start up in a few days, employing 200 men.

The Nashville Foundry Company, Nashville, Tenn., recently organized, is proceeding with the construction of its buildings and the foundry will be ready to open by May 1. A seven-story brick structure will be utilized and 50 men will be employed. J. W. Satterwhite, O. H. Looney, W. F. Roberts and L. E. Jones are identified with the company.

The American Car & Foundry Company, St. Louis, Mo., will erect an addition to its plant at Binghampton, Tenn., near Memphis, to cost $200,000 and employ 400 men. The plant has been closed since October. With the completion of the wheel foundry it will employ 1800 men. The resumption of operations depends on business conditions.

The Ralph Molding Device Company has been incorporated at Buffalo, N. Y., with a capital stock of $100,000, to manufacture a patented molding machine for metal castings and will establish a factory in Buffalo. Maulsby Kimball, E. C. Shafer, Clifford E. Branch and B. Kerr, Buffalo, are directors, and the company's office will be located at 786 Ellicott square for the present.

The Manitowoc (Wis.) Foundry & Machine Company has been incorporated by Michael W. Glenn, Samuel G. Smith and Lillie Smith, with a capital stock of $30,000.

The Union Steel Casting Company, Pittsburgh, has been making six heats per week from January 1 until week before last, when seven heats were made, while last week the company made eight heats. It reports that business is slowly improving and that it expects soon to be able to run to nearly full capacity.

Bridges and Buildings.

William Farris & Brother, bridge engineers and contractors, 204 Diamond Bank Building, Pittsburgh, have received a contract for three highway bridges, with reinforced concrete foundations, to be built over the Bluestone River in Mercer County, W. Va.

Fires.

The plant of the Bowker Fertilizer Company, Brooklyn, N. Y., was burned March 22. The loss is placed at $30,000.

The plant of the Beaver Dam Gas Company, Beaver Dam, Wis., was wrecked by an explosion March 15.

A part of the plant of the Penn Spring Works at Baldwinsville, near Syracuse, N. Y., was destroyed by fire March 22, the loss being about $50,000.

The oil mill and power plant of the Summit Gin & Improvement Company, Summit, Miss., were badly damaged by fire March 18, the loss being placed at $25,000.

Hardware.

The Washington Stove Works, Everett, Wash., is constructing a two-story addition, 48 x 50 ft., to its present plant, which will be devoted to the manufacture of a new line of sheet iron heaters. Later on it is proposed to include the manufacture of steel ranges.

V. B. Starr and A. M. Starr of the Starr Bros. Bell Company, East Hampton, Conn., have purchased the Nettleton reversible nipper patents of the Starr-Nettleton Company and plan to manufacture the tool at East Hampton.

The Northwestern Consolidated Iron & Steel Mfg. Company, Burlington, Iowa, has been recently organized for the manufacture of a line of hardware specialties, and is incorporated with a capital stock of $50,000. The company has purchased the machinery and patents of the Pierce & Laux Mfg. Company and is now making in connection with its own line the products formerly made by this concern, which include several patented articles. A. L. Kriechbaum, secretary of the company, was formerly connected with Hibbard, Spencer, Bartlett & Co., Chicago. The other officers are F. C. Ihrer, president; W. W. Copeland, vice-president.

Miscellaneous.

The Rock Island Plow Company, Rock Island, Ill., has increased its capital stock from $600,000 to $2,200,000. While plant extensions are contemplated, present plans do not include any work in this direction during the current year.

The Board of Public Works of Nashville, Tenn., has awarded contract for steel valve deck plate for the Holly engine at the pumping station to the Nashville Machine Company.

R. W. Smith, Charlotte, N. C., intends to establish a plant for the manufacture of wire nails, the installation of which will be started about June 1.

The new factory buildings of the Waterbury Mfg. Company, Waterbury, Conn., maker of brass goods, mentioned in this column last week, are not intended so much to make addition to manufacturing capacity as to replace some of the older buildings on the premises that they may be more in harmony with structures of later erection. It being a dull time for orders, the company decided to do some building if they can be constructed at low enough prices. The matter is not yet fully determined. The buildings as planned will probably be six stories in hight and of brick, mill construction, though cement is also being considered.

The New Century Steel, Wire & Iron Works, 602-604 South Regester street, Baltimore, Md., recently incorported, with a capital stock of $20,000, has installed a plant for the manufacture of the New Century automatic farm gate, in addition to which it will make a full line of common steel gates. The machinery has all been secured, with the exception of a combination punch and shear. J. E. Reinburg is president, and M. A. Blackburn, secretary and treasurer. James W. Denny and Henry A. Roth are also interested.

The plant, equipment and stock of the North Penn Iron Company, Philadelphia, Pa., has been sold at public sale to Samuel T. Freeman & Co. The company was adjudged a bankrupt some time ago.

The question of a bond issue for the purpose of building a system of water works will be submitted to the voters of Winchester, Ill., some time in May. The expenditure contemplated for this improvement is between $30,000 and $40,000.

Trade Publications.

Mercury Arc Rectifiers.—General Electric Company, Schenectady, N. Y. Bulletin No. 4530, superseding Nos. 4411 and 4472. Describes and illustrates mercury arc rectifiers for producing direct current from alternating current for storage battery charging and other commercial purposes. A brief outline of the theory of the apparatus is given and various types of rectifying sets are shown.

Traction, Stationary and Portable Gasoline Engines.—Kansas City Hay Press Company, Kansas City, Mo. Catalogue. Describes particularly a traction gasoline engine which embodies recent improvements in the company's stationary and portable gasoline engines. It has a capacity of 10 hp., makes a speed of from 2½ to 3 miles per hour and weighs 7200 lb. It is especially recommended for farm work, since it can be used to operate stationary machinery when not engaged in hauling loads. The catalogue describes in detail the principal parts of the engine.

Pneumatic Tools.—Ingersoll-Rand Company, 11 Broadway, New York. Mailing card. Calls attention to the economies resulting from the use of pneumatic tools, showing the per cent. of saving in cost and time over hand labor methods.

Crushing Rolls.—Sturtevant Mill Company, Boston, Mass. Bulletin series 107. Contains illustrated descriptions of the Sturtevant crushing rolls, including sectional views, outlines their special utilities, and calls attention to other products of the company which are a part of its line of rock and ore crushing, granulating, pulverizing, grinding and screening machinery.

Billet Prices Outside of Pittsburgh.

In order to overcome the disadvantages in freights of finishing mills located outside of Pittsburgh that are consumers of steel billets, there has been formulated a schedule of delivered prices on billets under the terms of which the mill absorbs one-half the freight rate when it is more than $1 a ton and up to $3 a ton. This equalization in the prices of billets is not in any sense a reduction on the base price, which remains at $28, Pittsburgh, but has been made solely to put consumers of billets located at points far distant from the supply on an equitable basis in competing with finishing mills located nearer Pittsburgh, and which, therefore, have the advantage of lower rates of freight. For instance, the rate on billets from Pittsburgh to Albany is $2.60 a ton, so that the delivered price of billets in Albany under the new arrangement would be the base price at Pittsburgh, $28, plus one-half the freight of $1.30, or $29.30. To Buffalo the billet rate from Pittsburgh is $1.80, so that the delivered price on billets would be $28.90, Buffalo. To several other points the delivered price on 4 x 4 in. billets is as follows: Bethlehem, Pa., $29.20; Bridgeport, Ohio, $29.50; Boston, Mass., $29.50; Cleveland, Ohio, $28.75; Chicago, Ill., $29.50; Canal Dover, Ohio, $28.60; Corry, Pa., $28.75; Detroit, Mich., $29.15; Franklin, Pa., $28.70; New York City, $29.30; Philadelphia and vicinity, $29.20, and Zanesville, Ohio, $28.75.

OBITUARY.

PETER J. DONOHUE, a prominent manufacturer of Brooklyn, N. Y., died March 21, aged 80 years. He was born in Ireland and came to the United States when a boy. He founded the steam boiler manufacturing firm of P. J. Donohue & Sons. He was a United States boiler inspector during the last administration of President Cleveland.

S. DECATUR SMITH, well known in the foundry trade, died in the Jefferson Hospital, Philadelphia, Pa., in which city he resided, on March 18. He met with an accident about a month ago, which resulted in a broken leg, causing complications from which at his advanced age he was unable to recover. He was 88 years old. While actively engaged in the foundry trade for a long period, he retired from active business several years ago. He leaves a widow and one son.

JOHN EASTWOOD, president of the Eastwood Wire & Chemical Mfg. Company, Belleville, N. J., died March 24 at St. Augustine, Fla., after an illness of only a few days. In 1843 he began business in Belleville in the manufacture of liquor used in setting colors in silk. In 1874 he went into the wire weaving business, developing an important establishment.

JOHN GOOD, once president of the National Cordage Company, died at his home in Brooklyn, N. Y., March 23. He invented many appliances for simplifying rope making and organized two large cordage companies. His last venture was the John Good Cordage Company, which went into the hands of a receiver.

Heavy Losses by Molders' Strikes.

The National Founders' Association, in the March issue of its *Review*, gives a summation of the causes and outcome of 114 molders' strikes in 99 cities in the period from March, 1904, to May, 1907. These strikes were supported by the Iron Molders' Union, and the largest of them were started in 1906. The *Review* says that for seven years previous to 1904 the foundrymen of the United States and Canada made persistent efforts to negotiate with the Iron Molders' Union, and nearly 2500 conferences were held in that period, participated in by officers of the union. "The union persisted in forcing its obnoxious conditions upon the foundry proprietors—conditions which, if accepted, meant the ruination of the foundry business in this country. These union efforts culminated in 1906, when the molders' organization started the largest strike ever known in the foundry business."

The summation of losses, based upon data in the possession of the National Founders' Association and information specially gathered for the present exhibit, shows that the strike benefits paid in the 114 strikes were $1,382,965. The approximate loss in wages is put at $3,803,935. It is impossible to give here in brief a statement of the outcome of the above strikes. The *Review* devotes a paragraph, in some cases an extended one, to a statement of the outcome of each. The memorandum, "open shop established," applies to many of the 99 cities. In other cases it is stated that nonunion shops were established. In not one instance does it appear that the union succeeded in winning its demands. The article says: "This enormous loss of 5¼ millions is only a portion of what the union has squandered in three and a half years in a futile attempt to enforce the strictly closed shop, an illegal and unwarranted undertaking. These strikes were absolutely lost to the union a year ago, but only within a few months has it seen fit to do the proper thing in the interests of the molders and call them off."

The iron market commentators are finding some humor in the present situation. One sales agent in introducing his weekly letter to his house wrote recently: "The stronger undertone referred to in our last report has gone further under in the week just closed."

The Iron and Metal Trades

There has been a halt in the volume of new business placed during the last 10 days, and the improvement, which has been gradual and quite steady since the beginning of the year, has not been maintained. There has been some misinterpretation of the report made by the United States Steel Corporation that there was an increase in new orders of 25 per cent. in January over December, and of a like amount for February over January and of the first half of March over February. The tonnage of new orders in December was about 8500 tons per day, or roughly 28 per cent. of the productive capacity. Adding the progressive increases over previous months an active capacity of about 50 per cent. was reached during the first half of March, as reported at the time.

The crux of the situation lies in the restricted demands from the railroads, which in ordinary times consume about 60 per cent. of the production, and their buying in turn depends upon the ability of the railroads to finance their requirements. In some instances the burden of that financing has been shifted to the builders of equipment, a course which has its limitations.

While the locomotive builders have taken some very good orders during the last week, the car builders have very little in sight, and the shipbuilders on the lakes are now practically out of work. This means a slack demand for Plates and Shapes.

The New York Central Road has placed an order for 24,000 tons of Steel Rails with the Lackawanna Steel Company, and is negotiating with other mills for additional quantities.

No important contracts for Structural Material have been let, but some pretty large work is coming up, like the Beaver Bridge, calling for 14,000 tons; the elevated work for the Reading in Philadelphia, 16,000 tons; the new building on the site of the Fifth Avenue Hotel, with a minimum of 7000 tons, and the extension of the Hotel Astor in New York.

While the immediate prospects of those who depend upon the railroads are not very encouraging, the lighter lines which largely sell to the farming interests, directly and indirectly, have been holding up very much better. The Wire trade has now, however, accumulated an adequate stock to take care of the spring trade well, and production will probably be somewhat less active.

The Pig Iron markets are very quiet throughout the whole country. The market is in the possession of those makers who have not committed themselves to the effort to maintain prices. Ferromanganese is lower, a large lot having been sold on the basis of $42.50 seaboard.

Copper has advanced squarely to 13¼c. for both Lake and Electrolytic, and there has been some business, although its volume is being exaggerated in the public prints. There has been buying for home consumption, but there has been little demand for export, on account of the advance.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Mar.25, 1908.	Mar.18, 1908.	Feb.26, 1908.	Mar.27, 1907.
PIG IRON, Per Gross Ton:				
Foundry No. 2, Standard, Philadelphia	*$17.75*	$18.25	$18.25	$24.25
Foundry No. 2, Southern, Cincinnati	*15.25*	15.25	15.75	26.00
Foundry No. 2, Local, Chicago	17.50	17.50	17.50	26.00
Bessemer, Pittsburgh	*17.75*	17.90	17.90	22.85
Gray Forge, Pittsburgh	15.90	15.90	15.90	21.60
Lake Superior Charcoal, Chicago	*20.50*	21.50	21.50	26.50
BILLETS, &c., Per Gross Ton:				
Bessemer Billets, Pittsburgh	28.00	28.00	28.00	29.00
Forging Billets, Pittsburgh	30.00	30.00	30.00	36.00
Open Hearth Billets, Phila	*29.20*	30.40	30.40	32.00
Wire Rods, Pittsburgh	35.00	35.00	35.00	37.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
Steel Rails, Melting, Chicago	*12.00*	12.25	13.00	18.00
Steel Rails, Melting, Phila	*12.75*	12.75	14.50	19.25
Iron Rails, Chicago	*15.00*	15.00	17.00	25.00
Iron Rails, Philadelphia	*17.00*	17.00	18.00	27.00
Car Wheels, Chicago	*15.50*	15.50	15.75	24.00
Car Wheels, Philadelphia	*14.00*	14.00	16.00	24.00
Heavy Steel Scrap, Pittsburgh	*13.00*	13.00	13.75	18.00
Heavy Steel Scrap, Chicago	*11.25*	11.50	12.50	16.00
Heavy Steel Scrap, Philadelphia	*12.75*	12.75	14.50	18.75
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia	1.65	1.65	1.65	1.93½
Common Iron Bars, Chicago	1.65	1.65	1.65	1.81½
Common Iron Bars, Pittsburgh	1.50	1.50	1.50	1.80
Steel Bars, Tidewater, New York	1.76	1.76	1.76	1.74½
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.60
Tank Plates, Tidewater, New York	1.86	1.86	1.86	1.84½
Tank Plates, Pittsburgh	1.70	1.70	1.70	1.70
Beams, Tidewater, New York	1.86	1.86	1.86	1.84½
Beams, Pittsburgh	1.70	1.70	1.70	1.70
Angles, Tidewater, New York	1.86	1.86	1.86	1.84½
Angles, Pittsburgh	1.70	1.70	1.70	1.70
Skelp, Grooved Steel, Pittsburgh	1.70	1.70	1.70	1.90
Skelp, Sheared Steel, Pittsburgh	1.80	1.80	1.80	2.00
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, No. 27, Pittsburgh	2.40	2.40	2.40	2.50
Wire Nails, Pittsburgh	2.05	2.05	2.05	2.00
Cut Nails, Pittsburgh	*1.90*	1.90	2.00	2.05
Barb Wire, Galv., Pittsburgh	2.50	2.50	2.50	2.45
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York	**13.25**	13.00	12.62½	25.25
Electrolytic Copper, New York	**13.25**	12.87½	12.50	25.12½
Spelter, New York	4.75	4.80	4.75	6.85
Spelter, St. Louis	*4.55*	4.60	4.75	6.65
Lead, New York	**4.00**	4.00	3.75	6.25
Lead, St. Louis	**3.85**	3.85	3.65	6.05
Tin, New York	**32.25**	30.50	28.70	40.35
Antimony, Hallett, New York	**9.50**	9.00	9.00	23.00
Nickel, New York	45.00	45.00	45.00	45.00
Tin Plate, 100 lb., New York	$3.89	$3.89	$3.89	$4.09

Chicago.

FISHER BUILDING, March 24, 1908.

The Iron and Steel interests find encouragement and reassurance in the fact that, however slight it may be in some lines of mill products, there is unquestionably improvement noted in nearly all departments. The tonnage of new business and specifications being entered by the Illinois Steel Company is now within 60 per cent. of the daily average for 1907. With the exception of the sheared and universal Plate mills, the mills at the South Works are this week all in operation; the Plate mills will probably be started up next week. The adoption of Iron Axles for the 2500 stock cars to be built by the Chicago, Milwaukee & St. Paul Railroad will divert this tonnage from the Steel mills to the forge shops. Further evidence of the unabated activity of this road in pushing construction work on its Pacific Coast extension was furnished by the placing of an order with the principal interest for 30,000 kegs of Spikes. Another order for fastenings placed last week by the Chicago Street Railroad System comprised 1000 tons of Fish Plates, which went to the Pennsylvania Steel Company. The tonnage of Structural Material secured by fabricators last week was extremely light. The most important Structural projects are holding back, some doubtless because of the difficulty experienced in financing large enterprises, while others are perhaps influenced by the hope of an ultimate break in Steel prices. At a meeting of the Central Freight Association, held in Chicago last week, it was finally decided to postpone action indefinitely relative to the raising of the freight rate

on Cast Iron Pipe 25 cents per ton in Central territory north of the Ohio River.

Pig Iron.—The Pig Iron market has experienced another extremely dull week. Some of the furnacemen are of the opinion that the foundry melt is steadily increasing in a moderate way, but not to an extent that is forcing consumers into the market. Absence of transactions covering more than carloads and small lots for immediate or nearby delivery makes it difficult to determine what prices might be developed by offers of round tonnage. Northern furnace interests are positive in their statements that they are not seeking forward delivery contracts at prices below those now being quoted, notwithstanding the sagging in values of Southern Iron. The principal Southern producers maintain their unwillingness to sell far into the second half for less than $13. Birmingham, for No. 2 Foundry, but it is well established that $12.50 can be done, and rumors of $12 are still heard. There is no question that sales have been made at the latter figure, but how much strictly No. 2 Foundry is available at this price is not determined. Nothing in the way of firm inquiries indicating a purpose to buy is heard from the malleable foundries. Based upon the general tendency toward improvement seen in nearly all lines, there is, in spite of the existing dullness, a hopeful feeling of encouragement among the furnace interests. The following prices are for March delivery, f.o.b. Chicago:

Lake Superior Charcoal	$20.50 to $21.00
Northern Coke Foundry, No. 1	18.00 to 18.50
Northern Coke Foundry, No. 2	17.50 to 18.00
Northern Coke Foundry, No. 3	17.00 to 17.50
Northern Scotch, No. 1	18.50 to 19.00
Southern Coke, No. 1	17.35 to 17.85
Southern Coke, No. 2	16.85 to 17.35
Southern Coke, No. 3	16.35 to 16.85
Southern Coke, No. 4	15.85 to 16.35
Southern Coke, No. 1 Soft	17.35 to 17.85
Southern Coke, No. 2 Soft	16.85 to 17.35
Southern Gray Forge	14.85 to 15.35
Southern Mottled	14.60 to 15.10
Malleable Bessemer	17.50 to 18.00
Standard Bessemer	19.40 to 19.90
Jackson Co. and Kentucky Silvery, 6 %	20.40 to 20.90
Jackson Co. and Kentucky Silvery, 8 %	22.40 to 22.90
Jackson Co. and Kentucky Silvery, 10 %	24.40 to 24.90

Billets and Rods.—Beyond the incidental lots of small tonnage that have for some time comprised the full measure of market activity, there is nothing doing in Billets. It is understood that the 10,000 Car Axles required for the 2500 new cars to be built by the Chicago, Milwaukee & St. Paul will be of Iron; competition among the Steel mills for this tonnage will therefore be eliminated. Forging Billets remain firm at the ruling quotations of $33 to $34, Chicago. Wire Rods continue unchanged, as follows: Bessemer, $35; Basic, $36; Chain, $37, all at Pittsburgh.

Rails and Track Supplies.—No new Rail tonnage of importance has appeared in the market during the week. Light Rail orders are coming in very slowly. Both the standard and rerolling mills of the Illinois Steel Company are running, but the latter is not provided with specifications to assure its indefinite continuance. Spike orders have developed through March at a rate somewhat in excess of the output capacity of the company's Joliet factory. To the tonnage previously reported were added 30,000 kegs placed last week by the Chicago, Milwaukee & St. Paul. An order for 1000 tons of Fish Plates for reconstruction work on the Chicago street railroad system was secured by the Pennsylvania Steel Company. We quote as follows: Angle Bars, accompanying Rail orders, 1908 delivery, 1.65c.; car lots, 1.75c. to 1.85c.; Spikes, 1.90c. to 2c., according to delivery; Track Bolts, 2.40c. to 2.50c., base, Square Nuts, and 2.55c. to 2.65c., base, Hexagon Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 25 to 45 lb., $28; 20-lb., $29; 16-lb., $30; 12-lb., $31. Standard Sections, $28, f.o.b. mill, full freight to destination.

Structural Material.—It had been expected that contracts for a considerable amount of Structural tonnage would be placed last week, but results in this respect were disappointing. It is believed that closures were held back in the hope that the meetings of the Steel committees in New York on Thursday night result in a decision to reduce prices. The reaffirmation of prices has, however, eliminated any hope of immediate action in that direction. Considering the number of moderate sized projects upon which estimates are being furnished, and the numerous new plans being submitted for figures, the situation is prospectively stronger. The only transactions of any note reported for last week were the contract let by the city of Milwaukee for the Kinnickinnic avenue bascule bridge amounting to 960 tons, which was taken by Arthur Vogel for $119,842, the fabricating work going to the Worden-Allen Company, Milwaukee, and 800 tons of bridge material taken by the Pennsylvania Steel Company. A small contract was secured by the Minneapolis Steel Machinery Company, Minneapolis, for an addition to the State Capitol at Boise, Idaho. The Structural mill of the Illinois Steel Company at the South Works is in operation this week, but unless specifications are materially augmented by an increase in new business, it is likely that another period of idleness will ensue. Prices from store are quoted without change at 2.05c. to 2.10c., and mill prices at Chicago are as follows: Beams and Channels, 3 to 15 in., inclusive, 1.88c.; Angles, 3 to 6 in., ¼-in. and heavier, 1.88c.; larger than 6 in. on one or both legs, 1.98c.; Beams, larger than 15 in., 1.98c.; Zees, 3 in. and over, 1.88c.; Tees, 3 in. and over, 1.93c., in addition to the usual extras.

Plates.—Although not stronger in a notable increase of business there is a better feeling in the market. The number and character of inquiries coming in indicate an awakening of interest from some of the dormant projects requiring Plates. The car shops, however, are practically out of the market, having no immediate prospect of new car orders. Some of the mills are willing to cut prices from $2 to $3 a ton when there is any business to be secured by price concessions. It is probable that the Sheared Plate mill of the Illinois Steel Company, which has been idle for some weeks, will be started up again next week. We quote for mill shipment as follows: Tank Plates, ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.88c. to 2.08c.; 3-16 in., 1.98c. to 2.18c.; Nos. 7 and 8 gauge, 2.03c. to 2.23c.; No. 9, 2.13c. to 2.33c.; Flange quality, in widths up to 100 in., 1.98c. to 2.08c., base, for ¼-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.98c. to 2.18c.; Flange quality, 2.08c. Store prices on Plates are as follows: Tank Plates, ¼-in. and heavier, up to 72 in. wide, 2.10c. to 2.20c.; from 72 to 96 in wide, 2.20c. to 2.30c.; 3-16 in. up to 60 in. wide, 2.20c. to 2.35c.; 72 in. wide, 2.40c. to 2.50c.; No. 8 up to 60 in. wide, 2.20c. to 2.25c.; Flange and Head quality, 0.25c. extra.

Sheets.—In point of activity Sheets continue in the lead of rolling mill products. All the mills of the Inland Steel Company are now on double turn, and a fairly good tonnage of new business is being entered. As a rule buyers are ordering conservatively and not far in advance of actual wants. At the same time several fair sized contracts for delivery some months ahead have been placed by jobbers. Prices are reported to be firmly maintained. We quote mill shipments as follows, Chicago: Blue Annealed, No. 10, 1.98c.; No. 12, 2.05c.; No. 14, 2.08c.; No. 16, 2.18c.; Box Annealed, Nos. 17 to 21, 2.43c.; Nos. 22 to 24, 2.48c.; Nos. 25 to 26, 2.53c.; No. 27, 2.58c.; No. 28, 2.68c.; No. 29, 2.78c.; No. 30, 2.88c.; Galvanized Sheets, Nos. 10 to 14, 2.63c.; Nos. 15 and 16, 2.83c.; Nos. 17 to 21, 2.98c.; Nos. 22 to 24, 3.13c.; Nos. 25 and 26, 3.33c.; No. 27, 3.53c.; No. 28, 3.73c.; No. 30, 4.23c. Black Sheets from store: Blue Annealed, No. 10, 2.20c.; No. 12, 2.25c.; No. 14, 2.30c.; No. 16, 2.40c.; Box Annealed, Nos. 18 to 21, 2.60c.; Nos. 22 to 24, 2.65c.; No. 26, 2.70c.; No. 27, 2.75c.; No. 28, 2.85c.; No. 30, 3.25c.; Galvanized from store: Nos. 10 to 16, 3c.; Nos. 18 to 20, 3.15c.; Nos. 22 to 24, 3.30c.; No. 26, 3.50c.; No. 27, 3.70c.; No. 28, 3.90c.; No. 30, 4.40c. to 4.45c.

Bars.—There is possibly a trifle of improvement in Bar specifications, but it is not pronounced enough to change the situation materially. The various mills in this district continue to run intermittently as the accumulation of tonnage warrants. Three of the Bay View mills of the Illinois Steel Company are in operation this week. Improved weather conditions form the basis of hope for a general quickening of the pulse of trade and a marked degree of improvement in the near future. Quotations, Chicago, are as follows: Steel Bars, 1.78c., with half extras; Iron Bars, 1.65c.; Hoops, 2.18c., extras as per Hoop card; Bands, 1.78c., as per Bar card, half extras; Soft Steel Angles and Shapes, 1.88c., half extras. Store prices are as follows: Bar Iron, 2.10c. to 2.25c.; Steel Bars, 2c. to 2.10c.; Steel Bands, 2c., as per Bar card, half extras; Soft Steel Hoops, 2.35c. to 2.45c., full extras.

Merchant Pipe.—A project is under consideration for the extension of the Government's pneumatic tube service in this city, which if finally carried out will require a large amount of Pipe. The present system is constructed of brass tubing, but the Wrought Pipe interests are making investigations with a view to submitting proposals for Steel Pipe in case the proposed construction takes definite form. Pipe of about 3 in. in diameter would probably be required for this service. There is no noteworthy change in the development of new business, which is being offered only in small orders to meet actual requirements. The number of inquiries received, however, is increasing under the influence of favorable weather conditions. Conservative buying on the part of jobbers for some months past has effected a reduction in stocks. However, under the limited demand made upon them, they are ample for present needs. The following mill discounts are quoted: Black Pipe, ¾ to 6 in., 71.2; 7 to 12 in., 68.2; Galvanized, ¾ to 6 in., 61.2. These discounts are subject to one point on the base. From store, in small lots, Chicago jobbers quote 72 to 72½ per cent. on Black Steel Pipe, ¾ to 6 in. From 2 to 3 points above these prices is asked for Iron Pipe.

Boiler Tubes.—Aside from the small orders representing the incidental needs of contract and repair shops, there is no movement of significance in Merchant Tubes. Mill orders from jobbers and manufacturers are limited to sorting up requirements. There is practically no buying for forward deliveries. Mill quotations for future delivery, on the base

sizes, are as follows: 2⅜ to 5 in., in carload lots, Steel Tubes, 63.2; Iron, 50.2; Seamless, 49.2; 2½ in. and smaller, and lengths over 18 ft., and 2½ in. and larger, and lengths over 22 ft., 10 per cent. extra. Store prices are as follows:

	Steel.	Iron.	Seamless.
1 to 1½ in.	35	35	35
1¾ to 2¼ in.	50	35	35
2½ in.	52½	35	35
2¾ to 5 in.	60	47½	47½
6 in. and larger	50	35	..

Merchant Steel.—In the small volume of business coming to the mills there is noted a slightly better demand for Machinery Steel and small Shapes from manufacturers of Hardware specialties. There is also a fair demand for Tires, Toe Calk and Spring Steel from the Heavy Hardware jobbers and blacksmith shops. Shafting discounts are still subject to more or less shading. Quotations are as follows: Planished or Smooth Finished Tire Steel, 1.98c.; Iron Finish up to 1½ x ½ in., 1.93c., base, Steel card; Iron Finish, 1½ x ½ in. and larger, 1.78c., base, Tire card; Channels for solid Rubber Tires, ¾ to 1 in., 2.28c., and 1⅛ in. and larger, 2.18c.; Smooth Finished Machinery Steel, 2.18c.; Flat Sleigh Shoe, 1.93c.; Concave and Convex Sleigh Shoe, 2.08c.; Cutter Shoe, 2.46½c.; Toe Calk Steel, 2.33c.; Railroad Spring, 1.98c.; Crucible Tool Steel, 7¼c. to 8c., and still higher prices are asked on special grades. Shafting, 54 per cent. off in car lots; 48 per cent. less than car lots, base territory delivery.

Cast Iron Pipe.—The letting by the city of Cincinnati of 2000 tons advertised for March 17 has been deferred until April 2. No prospective lettings of important tonnage are reported, but a few of minor importance ranging from 100 to 500 tons will be in the market within the next week or two. About 400 tons let last week by Muscatine, Iowa, was taken by the Dimmick Pipe Company. The demand for Gas Pipe is exceedingly light, there being very few new installations, and existing plants are making only such extensions and repairs as are absolutely necessary. Competition for what business there is is extremely keen, often resulting in sharp concessions from regular prices. We continue to quote nominally per net ton, Chicago, as follows: Water Pipe, 4-in., $30; 6 to 12 in., $29; 16-in. and up, $28, with $1 extra for Gas Pipe.

Old Material.—The past week has brought no developments of an encouraging nature as respects the indifferent attitude of consumers toward purchases of anything, save what is imperatively required for actual consumption. Even tempting concessions from the low prices now prevailing fail to rouse interest, and in consequence there are no noteworthy transactions to record. There have been inquiries in the market for small lots of various rolling grades from which perhaps a few unimportant sales have resulted. There is not enough of Foundry activity to create anything like a firm demand for melting stock, but no further recession in prices is noted on cast grades. It naturally follows, however, that under existing conditions prices are generally soft and yielding, and sellers are not inclined to abandon negotiations within any reasonable limit of values. Very little of the railroad material offered last week reached this market, but a list submitted by the Chicago, Burlington & Quincy for closure on March 25, comprising 5000 tons, will prove a test of its power of absorption. Among the important tonnages contained in the list are 1000 tons of Iron Rails, 750 tons Rerollers and about 700 tons of Wrought. We quote per gross ton, f.o.b. Chicago, as follows:

Old Iron Rails	$15.00 to $15.50
Old Steel Rails, rerolling	12.00 to 12.50
Old Steel Rails, less than 3 ft.	12.00 to 12.50
Relaying Rails, standard sections, subject to inspection	20.50 to 21.50
Old Car Wheels	15.50 to 16.00
Heavy Melting Steel Scrap	11.25 to 12.00
Frogs, Switches and Guards, cut apart	11.50 to 12.00
Mixed Steel	9.00 to 9.50

The following quotations are per net ton:

Iron Fish Plates	$13.50 to $14.00
Iron Car Axles	16.00 to 16.50
Steel Car Axles	14.75 to 15.25
No. 1 Railroad Wrought	11.00 to 11.50
No. 2 Railroad Wrought	10.00 to 10.50
Railway Springs	10.75 to 11.25
Locomotive Tires, smooth	14.00 to 14.50
No. 1 Dealers' Forge	9.00 to 9.50
Mixed Busheling	7.00 to 8.00
Iron Axle Turnings	6.00 to 6.50
Soft Steel Axle Turnings	6.00 to 6.50
Machine Shop Turnings	6.00 to 6.50
Cast Borings	4.75 to 5.25
Mixed Borings, &c.	4.75 to 5.25
No. 1 Mill	7.00 to 7.50
No. 2 Mill	6.00 to 6.50
No. 1 Boilers, cut to Sheets and Rings	7.00 to 7.50
No. 1 Cast Scrap	12.25 to 12.75
Stove Plate and Light Cast Scrap	10.25 to 10.75
Railroad Malleable	10.00 to 10.50
Agricultural Malleable	9.50 to 10.00
Pipes and Flues	8.00 to 8.50

Metals.—The better movement noted in last report has not been sustained. It is characteristic of the demand that it comes in spurts, showing an evident lack of the confidence that is necessary to establish it on a firm basis. Copper prices are reported to be firm and strong at present quotations, and Lead and Spelter have scored moderate advances. We quote as follows: Casting Copper, 13¼c.; Lake, 13¾c. to 14c., in car lots for prompt shipment; small lots, ¼c. to ⅜c. higher; Pig Tin, car lots, 33c.; small lots, 31½c.; Lead, Desilverized, 4.15c. to 4.25c., for 50-ton lots; Corroding, 5.35c. to 5.45c., for 50-ton lots; in car lots, 2¼c. per 100 lb. higher; Spelter, 5.25c.; Cookson's Antimony, 13c., and other grades, 11c. to 11½c.; Sheet Zinc is $7 list, f.o.b. La Salle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 12¾c.; Heavy Copper, 12¾c.; Copper Bottoms, 11c.; Copper Clips, 11c.; Red Brass, 12½c.; Yellow Brass, 10¼c.; Light Brass, 6½c.; Lead Pipe, 3¾c.; Zinc, 3¾c.; Pewter, No. 1, 21c.; Tin Foil, 23c.; Block Tin Pipe, 25c.

Cleveland.

CLEVELAND, OHIO, March 24, 1908.

Iron Ore.—Shipments from the docks to the furnaces are growing slightly better every week. The Steel Corporation is shipping about 50 per cent. as much Ore as it did this time a year ago, but the shipments by the merchant Ore firms are not showing up quite as well as that. Evidence of the improvement in shipments is shown by the figures of one Ore firm. The shipments of this firm during January were only 6 per cent. of those in January, 1907, but its March shipments are running about 43 per cent. of the March shipments a year ago. Early this week the Great Lakes Towing Company, which operates at all the lake ports except Milwaukee, reached an agreement with its employees, the tugmen's unions, under the terms of which the present wage scale, which has been in force for two years, will be continued for two years longer, or to May 1, 1910. During the past few days vessel capacity has been chartered to move 50,000 tons of Steel Rails from Lake Erie ports to the head of Lake Superior at 80c. a ton, the same price as was paid last year. Ore shippers have not yet taken up the matter of Ore carrying charges for this season and are not expected to do so for some time. There has been a very small amount of chartering for Ore at 75c. from the head of the lakes, the same as last year, but it is believed that lower rates will prevail. The amount of vessel tonnage that the Steel Corporation will be in the market for will depend to a large extent on the rates. If carrying charges are low, the corporation will use considerably more outside tonnage than if rates are well maintained. The leading interests all seem disposed not to start shipments of Ore down the lakes before June 1. The Ore market is still lifeless, no sales for this season being reported as yet. We quote Ore prices as follows, at Lake Erie docks, for 1908 delivery, per gross ton: Old Range Bessemer, $5; Mesaba Bessemer, $4.75; Old Range Non-Bessemer, $4.20; Mesaba Non-Bessemer, $4; Siliceous Bessemer, $2.75; Siliceous Non-Bessemer, $2.35 to $2.60.

Pig Iron.—The market remains almost stagnant. The only sales reported during the week were two 100-ton lots and a very few car lots. The demand is so limited that some of the furnace interests are not looking for orders, and unless considerable improvement is shown in the next few weeks one or two merchant furnaces in this territory will go out of blast as soon as they pile enough Iron to fill outstanding contracts. While some furnace interests report a slight improvement in shipping orders, one local furnace is not shipping as much Iron on contract as a month ago, and has sent out notices to those of its customers who are sending in no shipping orders that they must begin to take some of their contract Iron. A few consumers have pretty well cleaned up their old contracts, and when these are entirely wiped out a slight improvement is expected in the demand for spot Iron. The local melt has improved only slightly, and practically no sales are being made to local foundries. Local furnaces are holding firmly to the price schedule, but there are numerous reports of price cutting by furnaces in the Valley and other Ohio districts. Rather than make quotations below the established schedule, some of the furnaces will stay out of the market until prices become firmer. Of the two 100-ton lots reported sold during the week, one was sold by a local furnace to a local consumer at $17, at furnace, for No. 2 Foundry, and the other was to a Detroit consumer at $15.75, Valley furnace, for No. 2. The freight rate is $1.75, making the price $17.50, delivered, the schedule price for Detroit. The only inquiries for Southern Iron are for car lots. A few car lot sales were made during the week at $13, Birmingham. There are no inquiries for Basic Iron. For prompt shipment and for the second quarter, we quote, delivered, Cleveland, as follows:

Bessemer	$17.90
Northern Foundry, No. 1	17.85
Northern Foundry, No. 2	17.35
Northern Foundry, No. 3	16.85
Southern Foundry, No. 2	$16.85 to 17.35
Gray Forge	15.90 to 16.40

Coke.—The market remains inactive and prices are stationary. There is some demand for small lots of Foundry Coke for prompt shipment, but there is no inquiry for Fur-

nace Coke. We quote Connellsville Furnace Coke at $1.70 to $1.80, at oven, for prompt shipment, and Connellsville 72-hr. Foundry Coke at $2.25 to $2.50, at oven.

Finished Iron and Steel.—Taken altogether the past week has been as quiet as any since the first of the year in the Finished lines. Orders of all kinds have been scarce and only for very small lots. One or two mills report a little improvement in specifications. The strong competition for the small volume of business that comes up has resulted in a great deal of price cutting on the part of the smaller mills, and those that are maintaining prices are getting scarcely any of the orders. The demand for Iron Bars shows no improvement, and orders are usually for less than car lots. Local Bar mills are running this week with a limited amount of tonnage on their books. The price of Iron Bars remains weak, orders being taken on the basis of 1.40c., Pittsburgh. The demand for Steel Bars shows no improvement, but the price is being firmly maintained, with the exception that small mills are making concessions on Steel specialties. The locomotive building programme of one railroad has resulted in the placing of an order for Plates for fireboxes with a local mill. Plates are weak, prices of both Heavy and Light Plates being shaded $2 a ton by some of the smaller mills. Price concessions of at least $1 a ton are also being made on Sheets. The demand for Structural Material is very light. Contracts have been closed for about all the projected municipal work in this territory for this season, and there are no building projects in sight that will require a large tonnage. An order was placed with the local agent of a mill during the week for 20 car trucks. There are few inquiries for Billets. One order for 50 tons of Forging Billets is pending. They are held firm at $30, Pittsburgh. We quote Iron Bars at 1.50c. to 1.60c., Cleveland, for car lots; Steel Bars, 1.70c., Cleveland, for car lots, half extras; Beams and Channels, 1.80c., base, Cleveland, and Plates, ¼ in. and heavier, 1.80c., Cleveland. We quote Sheets, car lots, Cleveland, as follows, from mills: Blue Annealed, No. 10, 1.90c.; Box Annealed. No. 28, 2.60c.; Galvanized, No. 28, 3.65c. The store price on Steel Bars is 1.75c. to 1.85c., and on Iron Bars, 1.75c. to 1.80c. Warehouse prices on Sheets are as follows: Blue Annealed, No. 10, 2.10c.; Box Annealed, No. 28, 2.70c.; Galvanized, No. 28, 3.85c. Warehouse prices on Boiler Tubes, 2¾ to 5 in., are 64 per cent. discount, and on Black Merchant Iron Pipe, base sizes, 67 per cent. discount.

Old Material.—The market is weaker, quotations being 50c. to $1 a ton lower on Heavy Melting Steel and several other grades of Scrap. The demand is very light, no improvement being shown in this regard. Mills are buying only for their immediate needs and in car lots. An occasional car lot order is received from a foundry. Dealers have to a certain extent kept the market up by covering to fill orders on old contracts, but these contracts are now well cleaned up, and to this fact and the absence of a demand is attributed the new weakness in the market. The Lake Shore Railroad will sell about 1500 tons of Scrap this week. Dealers' prices to the trade, as revised, are as follows, per gross ton, f.o.b. Cleveland:

Old Steel Rails	$11.00 to $11.50
Old Iron Rails	15.00 to 16.00
Steel Car Axles	17.00 to 18.00
Old Car Wheels	15.00 to 15.50
Relaying Rails, 50 lb. and over	21.00 to 22.00
Heavy Melting Steel	11.00 to 11.50
Railroad Malleable	12.00 to 12.50
Agricultural Malleable	11.00 to 12.00
Light Bundled Sheet Scrap	7.50 to 8.50

The following quotations are per net ton, f.o.b. Cleveland:

Iron Car Axles	$16.00 to $16.50
Cast Borings	5.00 to 5.50
Iron and Steel Turnings and Drillings	7.00 to 8.00
Steel Axle Turnings	7.50 to 8.00
No. 1 Busheling	10.50 to 11.00
No. 1 Railroad Wrought	12.50 to 13.00
No. 1 Cast	12.00 to 13.00
Stove Plate	10.00 to 10.50
Bundled Tin Scrap	8.00 to 9.00

Birmingham.

BIRMINGHAM, ALA., March 23, 1908.

Pig Iron.—Some inquiries are received daily and requests of melters for prompt shipment of tonnage previously engaged give some life to the situation, but so far as sales are concerned the market is extremely quiet as compared with what it should be under normal conditions. The lull is not wholly unexpected, however, by reason of the fact that during the recent activity negotiations were consummated to cover the immediate requirements of most plants in operation. Foundries generally have increased their melt, and in some cases the consumption is normal, but idle capacity is still much in evidence. The ability to secure cars as readily as desired has been very effective toward the depletion of furnace stocks, and within the week the accomplishment in that direction is material. There are no indications of an immediate increase in the production, but six concerns now report their output disposed of as far ahead as July 1, and the output of the remaining active capacity is being moved in an apparently satisfactory manner. Quotations are believed to be firmer, and $13, Birmingham, on a No. 2 Foundry basis, with a differential of 50c. per ton for lower grades, is the market price. However, a recent sale evinces the fact that low grades can be had at a greater differential than quoted. The sale referred to is a lot of 250 tons of No. 4 Foundry, which sold for $11.50, Birmingham. An offer of $12.50 for 500 tons of Nos. 2 and 3 Foundry did not result in a sale, and a number of attempts to place small lots on the same basis were unsuccessful. Some resale Iron has been offered at $12, but the tonnage to be had is comparatively insignificant. Charcoal Iron is quoted at $21, furnace delivery.

Cast Iron Pipe.—Specifications have been received for 2000 tons of Water Pipe for the city of Memphis, Tenn., and the contract will be awarded to-day. The city of Meridian, Miss., will award a contract for 3000 tons of Water Pipe March 24, and bids have been submitted on a number of small orders which will probably be placed before April 1. The proposed expenditures for the cities of San Rafael and Los Angeles, Cal., as well as for San Francisco, will no doubt develop an attractive tonnage from that territory, and it is understood that small lots recently placed for Northern points are initiative orders. There appears to be no doubt that, if it could be done, the establishment of firm quotations would be effective toward an active market. We quote Water Pipe nominally as follows per net ton, f.o.b. cars here: 4 in. to 6 in., $27; 8 in. to 12 in., $25; over 12-in., average $24, with $1 per ton extra for Gas Pipe.

Old Material.—Some decrease is perceptible in stock accumulations, and in view of the fact that indications are favorable for a resumption of operations at the plants of probably the largest consumer in the district, dealers are more encouraged. The aggregate of sales for the week is in excess of that for last week, but quotations have not stiffened. We revise quotations on grades for which there is a demand as follows per gross ton, f.o.b. cars here:

Old Iron Rails	$16.50 to $17.00
Old Iron Axles	15.50 to 16.00
Old Steel Axles	14.50 to 15.00
No. 1 Railroad Wrought	13.00 to 13.50
No. 2 Railroad Wrought	10.00 to 10.50
No. 1 Country Wrought	11.50 to 12.00
No. 2 Country Wrought	9.50 to 10.00
Wrought Pipe and Flues	10.00 to 10.50
No. 1 Steel	11.50 to 12.00
No. 1 Machinery	10.50 to 11.00
Stove Plate and Light Cast	9.50 to 10.00
Cast Borings	6.00 to 6.50

Philadelphia.

PHILADELPHIA, PA., March 24, 1908.

The dullness which has characterized the local market for both crude and finished materials for a number of weeks continues. There is little disposition on the part of consumers to enter the market for anything beyond their immediate requirements. Notwithstanding the absence of business in any quantity there is a hopeful feeling prevalent, and it is believed that we will continue to hold the small increase in the tonnage of business on hand, and also make slight further gains in the near future. In some instances the Bituminous Coal situation is viewed with more or less anxiety, particularly as to the effect it would have on the trade should there be difficulty experienced with the miners or should a temporary suspension of mining be made after April 1.

Pig Iron.—Sales have been small and as a rule unimportant. Buyers are taking Iron somewhat more regularly than heretofore, but the tonnages have generally been small, the disposition being to buy in moderate lots at frequent intervals, covering to a great extent the immediate needs of consumers rather than buy for extended delivery. When, however, a tonnage is taken covering several months' delivery it is as a rule for but a small proportion of the usual requirements. There has been some little inquiry for Iron for more extended delivery, but makers are in most cases not willing to make quotations for delivery beyond the first half of the year. The Eastern Pig Iron Association, which met in this city last week, reports orders on the whole but slightly under those for the preceding month. One weak spot developed on the question of the price of Foundry Iron, but this was eliminated and prices based on $18.25, delivered, for No. 2X Foundry were reaffirmed. Stocks were reported as being practically unchanged, but it was also reported that unless there was an increase in the volume of business there would probably be a further curtailment in production. The preponderance of sales recently has been confined to the Foundry grades. Prices show some variation. The Eastern furnaces have in practically every case held to the established basis of $18.25 for No. 2X Foundry, at which quite a tonnage in the aggregate has been sold. Independent furnaces, however, are offering and have sold quite a tonnage on the whole at $17.75, delivered, so that at the time there are really two sets of prices at which business is being transacted. The Virginia furnaces also continue to maintain the lower figures named on No. 2X and

No. 2 Plain Foundry, and some little business has again been done by those interests at from $17.50 to $17.75 for No. 2X and $17 to $17.25 for No. 2 Plain, according to delivery point. Quite a fair tonnage of Pipe Iron has also been sold by the Virginia interests, but practically all of this has been for local or Western account. The pipe foundries in this territory have not been taking any heavy tonnages during the last week, but some buying in small lots from both Northern and Virginia furnaces has been reported. Forge Iron has been in light demand recently, and no sales of any moment have been made. Steel making Irons, generally speaking, show no increased demand. One mill placed an order for 5000 tons of Basic about 10 days ago, the price reported being $17.25, delivered. Low Phosphorus Irons have been in light demand. Sales of one or two small lots have been made at ruling quotations. There has also been some little inquiry for misfit Low Phosphorus Iron, but no business has resulted. To cover the selling prices of No. 2X and No. 2 Plain, the inside figures in the prices tabulated below represent those of the so termed independent furnaces, while the outside figures represent the prices of practically all of the Eastern furnaces, delivery in each case being for the remainder of the first half of the year, in buyers' yards, eastern Pennsylvania and adjoining territory:

No. 2 X Foundry	$17.75 to $18.25
No. 2 Plain	17.25 to 17.75
Gray Forge	16.50 to 16.75
Basic	17.25
Low Phosphorus	23.50 to 24.00

Ferromanganese.—A little more demand is to be noted for Ferro. One inquiry is on the market for 1000 tons for delivery during the second half of the year, while some small scattered lots for prompt delivery have also come out. Quotations are unchanged and range from $44 to $46, Baltimore.

Steel.—One sale of 1500 tons of Slabs for early delivery at the ruling quotations has been made. Outside of this business the demand has been of a hand to mouth character, consumers taking but small tonnages for prompt shipment. Mills are about able to hold their present rate of production and are largely dependent on daily orders to keep them in operation. Prices are firm, $29.20 being named for ordinary Rolling Steel, while Forging Steel is quoted at $31.20 to $33.40, according to analysis.

Plates.—No material change is to be noted in the demand for Steel Plates, and the volume of business coming out is made up largely of a variety of small orders, with an occasional one for a larger tonnage. One mill received an order recently for 2000 tons of Locomotive Plates, while several other fair sized lots which have been before the trade have not yet been placed. Mills are getting enough business to enable them to maintain their present rate of production, but as a rule are not able to make any appreciable gain. Prices continue firm and unchanged, the following range being quoted for delivery in this territory:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel	1.85	1.90
Flange or Boiler Steel	1.95	2.05
Commercial Firebox	2.05	2.10
Marine	2.25	2.30
Locomotive Firebox Steel	2.35	2.40

The above are base prices for ¼-in. and heavier. The following extras apply:

	Extra per 100 lb.
3-16-in. thick	$0.10
Nos. 7 and 8, B. W. G.	.15
No. 9, B. W. G.	.25
Plates over 100 to 110 in.	.05
Plates over 110 to 115 in.	.10
Plates over 115 to 120 in.	.15
Plates over 120 to 125 in.	.25
Plates over 125 to 130 in.	.50
Plates over 130 in.	1.00

Structural Material.—While there has been no particular increase in the sales for Structural Material, the tonnage inquired for is somewhat larger, and the trade is more encouraged regarding the future. Some new work in connection with the elevated structure of the Philadelphia & Reading Railway in this city is expected to come out shortly, which, it is reported, will require some 16,000 tons of Structural Material. With the advent of spring considerable business is also expected to develop in the building trades, and although the tonnage will probably not be large individually, it is believed that in the aggregate it will run to a very fair amount. Prices continue unchanged, 1.85c. to 2c. being quoted, according to specification.

Sheets.—Business continues on a fairly even basis, and mills are able to maintain an average output of about 50 per cent. of their capacity. Orders coming in are for moderate tonnages individually, and the business is largely of a miscellaneous character. Prompt shipment is asked in almost every case, as consumers' stocks are low, but there is no disposition shown to take any quantity beyond that required for immediate consumption. Prices are being well maintained. We quote for mill shipments, with a tenth extra for small lots, the following range: Nos. 18 to 20, 2.50c.; Nos. 22 to 24, 2.60c.; Nos. 25 to 26, 2.70c.; No. 27, 2.80c.; No. 28, 2.90c.

Old Material.—There is practically no demand for Old Material. Mills continue to show no interest in the market, and transactions have fallen off to occasional small lots for prompt shipments. Heavy Melting Steel is particularly inactive, but one sale of a small lot at $13, delivered, being reported. Prices are not strong, but remain unchanged in the absence of business. We quote about as follows for prompt deliveries in buyers' yards, eastern Pennsylvania and nearby points:

No. 1 Steel Scrap and Crops	$12.75 to $13.25
Low Phosphorus	17.50 to 18.00
Old Steel Axles	17.50 to 18.00
Old Iron Axles	20.00 to 21.00
Old Iron Rails	17.00 to 18.00
Old Car Wheels	14.00 to 15.00
Choice No. 1 R. R. Wrought	15.00 to 15.50
Machinery Cast	15.00 to 15.50
Wrought Iron Pipe	11.50 to 12.00
No. 1 Forge Fire Scrap	11.50 to 12.00
No. 2 Light Iron	9.00 to 10.00
Wrought Turnings	9.50 to 10.00
Stove Plate	12.00 to 12.50
Cast Borings	7.50 to 8.00
Grate Bars	11.75 to 12.25

Bars.—There has been no improvement in the demand for Iron Bars, and mills do not show any material gain in tonnage. Specifications on contracts come out very slowly, while new business is in small lots only, and plants are being operated on capacities ranging from one-quarter to one-half of their tonnage. At the meeting of the Bar Iron Association, held last week, the present price, 1.65c., delivered in this territory, was reaffirmed. A considerable amount of business, estimated at 20,000 tons, is on the books of the association mills, mostly at a lower range of prices, against which specifications are coming out very slowly. Shipments during February, by 23 mills in the association, on both old and new orders, aggregated about 10,500 tons, which is on a basis of about 40 per cent. of their normal capacity.

Coke.—Foundry Coke shows a little more activity. Contracts have been made in some cases for the year's delivery, dating April 1, at prices ranging from $2.25 to $2.50 at oven, but the tonnages taken have not been large. Furnace Coke has not been in much demand and the business transacted has not been extensive. Prices show practically no change, and while some sellers will contract at $2.25 to $2.50 at oven for Foundry Coke, others are holding at $2.75 at oven. Furnace Coke can be had at prices varying from $1.75 to $2.25, at oven, dependent on the grade. For delivery in the Philadelphia territory we quote the following range of prices:

Connellsville Furnace Coke	$4.00 to $4.50
Foundry Coke	4.45 to 4.95
Mountain Furnace Coke	3.60 to 4.10
Foundry Coke	4.10 to 4.60

Cincinnati.

CINCINNATI, OHIO, March 25, 1908.—(*By Telegraph.*)

Listless, and for the most part uninteresting and featureless, are the local markets on Iron and Steel. In the finished products buyers are still holding off, although dealers are hopeful, and recent investments in the way of improvement and enlargements show that they have confidence in the future. Local jobbing foundries, which have kept out of the market since the first of the year, are beginning to show some interest, and the first inquiry of any size is noted in the subjoined paragraphs concerning Pig Iron. The Scrap markets suggest still lower levels. The first of the month is expected to usher in notices of many changes in the various agencies and representatives of Iron selling concerns. Just now several heads of departments of large Pig Iron agencies are going over with furnace interests in and about Birmingham important matters affecting Cincinnati and other agency centers. Nothing has developed during the week in the various movements instituted by Coke consumers to secure lower tariffs on these products from ovens and furnaces. A meeting which was to have been held on the 25th has been postponed.

Pig Iron.—There are fewer inquiries out than for many weeks, and sellers are less certain of the market to-day than at any previous time this year. While standard brands of Southern No. 2 Foundry are quoted at $12.50, Birmingham, and even $13, it is generally acknowledged that the lower price is being shaded, and that the $12 figure is most frequently in evidence. The same conditions apply to the Northern product; while $16, at furnace, and even higher, is being asked, there is evidence of shading to $15.50 and $15.75. In the few instances that furnaces have been approached, for a price on last half requirements, they all suggest the conviction that it would be a mistake to sell for that period at present prices, although some few have quoted on deliveries extending into the third quarter. An Indiana melter is in the market for 500 to 1200 tons of analysis Foundry Iron for delivery during the last half. The Detroit inquiry for 750 tons each of Northern and Southern analysis, with 500 tons of Silvery 5 per cent. Silicon, is still pending, and will not be closed, it is said, for about two weeks. This contract contemplates delivery

through September and October. A local foundry is out with an inquiry for 500 tons of No. 3 Southern Foundry Iron. Eastern pipe interests are asking for prices on 2000 to 3000 tons of Foundry Irons. Some scattering inquiries for early deliveries on modest tonnages of 5 and 6 per cent. Silicons are noted also. Arrangements have been perfected to operate both the old and new Vanderbilt furnaces in North Birmingham. A new engine has been ordered, and will soon be installed so that the old stack will be kept in operation instead of blowing out, as originally designed. The furnace of the Embree Iron Company, Embreeville, Tenn., went into blast March 23. This furnace was banked in December. Reports from the Birmingham District show 20 furnaces of a total of 54 now in blast. Another of the Woodward furnaces is expected to go into blast next month. Indications are that the furnaces operating on Ohio Silveries are not parties to any shading of prices based on $19, at furnace, for 8 per cent. The prices given out by a leading interest are $18 for 6, $18.50 for 7, and $19 for 8 per cent., and it is affirmed that these prices are not being actually shaded, except possibly where an agent may sacrifice a small percentage of his commission in contesting close sales, which would not seriously affect the asked price. For immediate delivery and for balance of first half we quote f.o.b. Cincinnati, as follows, freight rates being $3.25, $1.80 and $1.20 from the Birmingham, Valley and Hanging Rock districts, respectively:

Southern Coke, No. 1	$15.75 to $16.25
Southern Coke, No. 2	15.25 to 15.75
Southern Coke, No. 3	14.75 to 15.25
Southern Coke, No. 4	14.25 to 14.75
Southern Coke, No. 1 Soft	15.75 to 16.25
Southern Coke, No. 2 Soft	15.25 to 15.75
Southern Coke, Gray Forge	13.75 to 14.25
Southern Coke, Mottled	13.25 to 13.75
Ohio Silvery, 8 per cent. Silicon	20.20 to 20.70
Lake Superior Coke, No. 1	17.70 to 18.20
Lake Superior Coke, No. 2	17.20 to 17.70
Lake Superior Coke, No. 3	16.70 to 17.20
Standard Southern Car Wheel	23.75 to 24.25
Lake Superior Car Wheel	22.50 to 23.00

(*By Mail.*)

Coke.—Some little increase is noted in the movement of Foundry Coke, but prices have not changed materially. Practically nothing is doing in Furnace brands, and absolutely nothing in the matter of deliveries beyond the first half. Connellsville Foundry is quotable at about $2.25 to $2.40, at oven, and for some specially select grades $2.50 has been done. In the New River District prices are a little stiffer, the range being about $2.65 to $3. Connellsville Furnace grades are quoted at $1.55 to $1.90. One 100 carload lot of Foundry Coke was an incident of last week. Best Virginia grades are bringing about $1.75 to $1.85, at oven, for Furnace, and $2.25 to $2.50 for Foundry.

Finished Iron and Steel.—Quiet still characterizes the market on finished products, there being no activity in any line. Stores are maintaining prices, and what little business is going is in small lots and for immediate needs. Collections are about the same, being neither good nor bad. Showing faith in the future, one of the prominent selling agencies has had plans drawn and contracts have been placed for a large extension to its place of business for carrying a greater stock of Steel. The enlargement plans of the Cincinnati Iron Store Company have already been noted. Dealers quote f.o.b. cars Cincinnati, as follows: Iron Bars, carload lots, 1.65c., with half extras; small lots from store, 1.85c., base, half extras. Steel Bars, carload lots, 1.75c., base, half extras; small lots from store, 1.85c., base, half extras. Base Angles, carload lots, 1.85c., base; small lots from store, 2.10c. Beams, Channels and Structural Angles, 1.85c., base; small lots from store, 2.10c. Plates, ¼ in. and heavier, carload lots, 1.85c.; small lots from store, 2.10c. Blue Annealed Sheets (heavy) No. 16, carload lots, 2.15c.; small lots from store, 2.50c. No. 14, carload lots, 2.05c.; small lots from store, 2.40c. No. 10, and heavier, carload lots, 1.95c.; small lots from store, 2.25c. No. 12, carload lots, 2c.; small lots from store, 2.35c. Sheets (light) Black, No. 28, carload lots, 2.65c. Galvanized Sheets, No. 28, carload lots, 3.70c. Steel Tire, 4-in. and heavier, carload lots, 1.95c., base. Plates, 3-16 and No. 8, carload lots, 2c.; small lots from store, 2.25c.

Old Material.—Dullness characterizes every division of the Old Material market. Dealers are still bearish and are not looking for any improvement soon. Reports from other sections, received at local Scrap headquarters, indicate that the inactivity is general. There is very little business between dealers, and scarcely anything is being done with the mills. The local market is about as follows, prices being f.o.b. Cincinnati:

No. 1 Railroad Wrought, net ton	$11.00 to $12.00
Cast Borings, net ton	4.50 to 5.00
Steel Turnings, net ton	5.00 to 6.00
No. 1 Cast Scrap, net ton	12.00 to 13.00
Burnt Cast and Wrought, net ton	8.00 to 9.00
Old Iron Axles, net ton	15.00 to 16.00
Old Iron Rails, gross ton	14.00 to 15.00
Old Steel Rails, long, gross ton	11.50 to 12.50
Relaying Rails, 50 lb. and up, gross ton	20.00 to 21.00
Old Car Wheels, gross ton	14.00 to 15.00
Low Phosphorus Scrap, gross ton	13.00 to 14.00

Pittsburgh.

PARK BUILDING, March 25, 1908.—(*By Telegraph.*)

Pig Iron.—The agreement on prices made at the meeting of furnace interests held in Cleveland last month is not being observed by two or three furnaces, with the result that the small tonnage of Pig Iron wanted by consumers is being sold at somewhat lower prices than those scheduled. At this time only five furnaces in the two valleys are running. While the usual quotation on Bessemer is $17, at furnace, sales have been made at $16.85 and $16.90, at furnace. Basic Iron is weaker, and is readily obtained at $15.50, Valley furnace, or $16.40, Pittsburgh. Foundry Iron also seems to be weaker, and we quote Northern No. 2 at $15.50 to $15.75, at Valley furnace. Sales of about 1000 tons of Northern No. 2 have been made at the lower price. Forge Iron is neglected, and the nominal market on Northern Forge is $15, Valley furnace, or $15.90, Pittsburgh, but on a firm offer, this might be shaded.

Steel.—Inquiries are reported as a little better, and this week the Bessemer plants of Republic and Youngstown Sheet & Tube are running full. Prices on Steel are firm. We quote Bessemer and Open Hearth Billets at $28, Sheet and Tin Bars at $29.50, and Forging Billets at $30, for delivery in Pittsburgh and nearby districts.

Iron Bars.—At a meeting of the Western Bar Iron Association held to-day in the Hotel Lincoln, Pittsburgh, existing prices on Iron Bars were reaffirmed.

(*By Mail.*)

Local conditions in the Iron and Steel trades are without special feature, but are of an encouraging nature. Leading Steel interests and finishing mills report that both new business actually placed this month and specifications against contracts are heavier than in February, which month showed an increase over January. The worst feature of the local situation is the Pig Iron market, which is practically an open one, and some low prices are being made. Bessemer Iron remains at $17, or slightly under, at Valley furnace, but Basic and Northern No. 2 Foundry are being rather freely offered at $15.50, Valley furnace. The price agreement made by the furnace interests in Cleveland last month is in the main being observed by the large producers, but a few of the makers are not living up to the agreement, and in the present light demand for Pig Iron are practically taking at low prices all the orders that are being offered. The situation in Steel is firm, and the new schedule of delivered prices on Billets, Sheet and Tin Bars just agreed on by the leading manufacturers, will no doubt give general satisfaction to consumers of Steel located at a distance from Pittsburgh, and who heretofore have been paying full rates of freight. The market on Finished Iron and Steel remains firm, and there is almost an entire absence of price cutting. Coke and Scrap are still dull and prices are weak.

Ferromanganese.—In the almost entire absence of demand, prices of Ferro are weaker, and we now quote 80 per cent. foreign at $43, Baltimore, or $44.95, Pittsburgh. We note a sale of about 50 tons of foreign to a local consumer at this price.

Muck Bar.—No actual sales have been reported in this market for some time, and there is no inquiry. We quote best grades of Muck Bar made from all Pig Iron at nominally $27 to $27.50, Pittsburgh.

Skelp.—The improvement in the demand for Tubular products is causing some inquiry for Skelp, and there have been moderate sales of Grooved and Sheared Steel Skelp. Prices are fairly strong and we quote: Grooved Steel Skelp, 1.60c.; Sheared Steel Skelp, 1.70c.; Grooved Iron Skelp, 1.80c., and Sheared Iron Skelp, 1.90c., f.o.b. Pittsburgh.

Rods.—Inquiries are reported as a little better, due to the larger demand for Wire Products, and several sales of Wire Rods are reported to have been made in this market recently. We continue to quote $35 for Bessemer Rods, $36 for Open Hearth and $37 for Chain Rods, f.o.b. Pittsburgh.

Steel Rails.—Inquiries for Rails for export are fairly active. The Carnegie Steel Company at present is figuring on about 20,000 tons of Standard Sections and about 6000 tons of Light Rails for foreign delivery. The Edgar Thomson mill continues in operation, with limited bookings ahead, but is only running to about 30 or 40 per cent. of capacity. Regular prices on Light Rails, which are still being shaded $3 to $4 a ton by the mills rerolling Rails, are as follows: 25 to 45 lb. Sections, $28; 20-lb., $29; 16-lb., $30, and 12-lb., $32. We quote Standard Sections at $28, at mill, and Angle Splice Bars at 1.65c., at mill.

Plates.—The situation continues quiet. While some important work is ahead that will require a good deal of ton-

nage, notably for water lines and other purposes, this is coming out but slowly, and all the Plate mills are badly in need of rolling orders. Not much new business can be expected from the Steel car interests for some time. Prices are fairly well maintained, but are sometimes shaded from $1 to $2 a ton, mostly on the narrow sizes. Regular prices are as follows: We quote: Tank Plates, ¼-in. thick, 6¼ in. up to 100 in. wide, 1.70c., base, at mills, Pittsburgh. Extras over this price are as follows:

	Extra per 100 lb.
Gauges lighter than ¼-in. to and including 3-16-in. Plates on thin edges	$0.10
Gauges Nos. 7 and 8	.15
Gauge No. 9	.25
Plates over 100 to 110 in	.05
Plates over 110 to 115 in	.10
Plates over 115 to 120 in	.15
Plates over 120 to 125 in	.25
Plates over 125 to 130 in	.50
Plates over 130 in	1.00
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.)	.10
Complete Circles	.20
Boiler and Flange Steel Plates	.10
"A. B. M. A." and ordinary Firebox Steel Plates	.20
Still Bottom Steel	.30
Marine Steel	.40

Shell grade of steel is abandoned.

TERMS.—Net cash 30 days. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes, 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Structural Material.—No local work involving any large tonnage has been placed for some time. The only job of any magnitude in sight is the Pittsburgh & Lake Erie bridge at Beaver, which is to be changed into a two-track structure. Contracts for the masonry work have been placed, but bids on the Steel will hardly be asked for for several months. This work will take about 14,000 tons, and the local Structural manufacturers are anxious to see it go through this summer. Low prices, in some cases actual cost or below, are being made by fabricators on the small amount of new work that is coming up. We quote: Beams and Channels, up to 15 in., 1.70c.; over 15 in., 1.80c.; Angles, 3 x 2 x ¼ in. thick, up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3½ in., 1.80c.; Zees, 3 in. and larger, 1.70c.; Tees, 3 in. and larger, 1.75c.; Bulb Angles and Deck Beams, 2c. Under the Steel Bar card Angles, Channels and Tees under 3 in. are 1.70c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Sheets.—The demand for both Black and Galvanized Sheets continues to show some improvement, and the American Sheet & Tin Plate Company is increasing its active Sheet capacity, now having approximately 50 per cent. in active operation. The independent mills are also running to larger capacity and the outlook, as compared with a month ago, is reported as decidedly better. Prices are quite well maintained, being only occasionally slightly shaded. Regular prices are as follows: Blue Annealed Sheets, No. 10 and heavier, 1.80c.; Nos. 11 and 12, 1.85c.; Nos. 13 and 14, 1.90c.; Nos. 15 and 16, 2c.; Box Annealed, Nos. 17 to 21, 2.25c.; Nos. 22 to 24, 2.30c.; Nos. 25 and 26, 2.35c.; No. 27, 2.40c.; No. 28, 2.50c.; No. 29, 2.60c.; No. 30, 2.70c. Galvanized Sheets: Nos. 10 and 11, 2.45c.; Nos. 12 and 14, 2.55c.; Nos. 15 and 16, 2.65c.; Nos. 17 to 21, 2.80c.; Nos. 22 and 24, 2.95c.; Nos. 25 and 26, 3.15c.; No. 27, 3.35c.; No. 28, 3.55c.; No. 29, 3.70c.; No. 30, 3.95c. No. 28 Painted Roofing Sheets, $1.75 per square, and Galvanized Roofing Sheets, No. 28, $3.10 per square, for 2½-in. corrugations. These prices are subject to a rebate of 5c. per 100 lb. to the large trade under the usual conditions, jobbers charging the usual advances for small lots from store.

Tin Plate.—The demand is slowly but steadily showing betterment, and the American Sheet & Tin Plate Company is operating this week 186 Tin mills, or about 75 per cent. of normal capacity. The independent mills also report a slight increase in orders, and the outlook is regarded as encouraging. We are advised that prices are being absolutely maintained, there being no disposition to cut prices in order to get business. We quote at $3.70 for 100-lb. Cokes, 14 x 20, f.o.b. Pittsburgh, terms 30 days, less 2 per cent. off for cash in 10 days, this price being subject to the usual rebate of 5c. per base box in large lots.

Iron and Steel Bars.—A meeting of the Western Bar Iron Association is to be held in the Hotel Lincoln, Pittsburgh, on Wednesday of this week, but it is not expected that any change in prices will be made. The Eastern and Western Bar Iron mills are working harmoniously together to sustain the market, with the result that prices are quite firm. New business in both Iron and Steel Bars continues light, and is mostly of a hand to mouth character, buyers usually insisting on prompt shipments, which is a clear indication that stocks are light. The Republic Iron & Steel Company is operating most of its Bar mills this week, and reports that both new business and shipments are better than in February. We quote Iron Bars at 1.50c. for the Pittsburgh District, and 1.47c., Pittsburgh, for Chicago and points further west. Steel Bars remain very firm at 1.60c., Pittsburgh.

Hoops and Bands.—As large consumers placed their contracts in January for this year's requirements no new business is being placed. Specifications against these contracts are coming in fairly well. Regular prices are as follows: Steel Hoops at $2, base, full Hoop card extras; Steel Bands, $1.60c., base, half Steel card extras, all f.o.b. cars, Pittsburgh, Pa., in carload lots, for delivery during 1908.

Spelter.—The demand is reported to be a little better, and prices are slightly firmer. Prime grades of Western Spelter are now held at 4.55c. to 4.60c., East St. Louis, equal to 4.67½c. to 4.72½c., Pittsburgh. The Western smelters have reduced the output of Spelter very materially recently in an effort to keep down stocks and prevent prices from a further decline.

Railroad Spikes.—The Great Northern Railroad recently placed an order for 15,000 kegs of Spikes, about equally divided between the Illinois Steel Company, Dilworth, Porter & Co. and the Jones & Laughlin Steel Company. The Big Four Railroad has also recently placed a good order for Spikes, and is expected to buy more in a short time. Prices have recently been rearranged, and we now quote Standard sizes, 4½ x 9-16 in., at $1.70, and the smaller sizes at $1.80 per 100 lb. in carloads and larger lots, with an advance of 5c. per 100 lb. for less than carload, f.o.b. Pittsburgh.

Merchant Steel.—Both new business entered and shipments by the mills this month are reported as slightly larger than in February, but present conditions in this trade are far from being satisfactory. The demand for Shafting is dull, and the regular price of 54 per cent. off in carloads continues to be shaded. We quote: Smooth Finished Machinery Steel, 1.80c. to 1.90c.; Flat Sleigh Shoe, 1.75c. to 1.85c.; Cutter Shoe Steel, 2.15c. to 2.25c.; Toe Calk, 2.10c. to 2.15c. Railroad Spring Steel, 1.60c. to 1.75c., the higher price being for Pennsylvania Railroad analysis. Carriage Spring Steel is 1.80c.; Tire Steel, Iron, finished, 1½ in. and wider, 1.60c.; under 1½ in., 1.75c. Planished Tire Steel is 1.80c., all f.o.b., at mill.

Pipes and Tubes.—Orders booked and specifications against contracts so far this month show an increase of 15 to 20 per cent. over the same period last month. It is believed that business from this time forward will steadily improve. It is stated that prices will not be changed prior to July 1 at least, with the chances largely in favor of present discounts being maintained through the year. As soon as financial arrangements can be made the Pipe for several oil and gas lines will be placed. Net discounts on Steel Pipe to the large trade on ¾ to 6 in. remain at 74 and 5 per cent. off list, while on Iron Pipe the absolute minimum is 72 and 5 per cent. Discounts on Steel Pipe are as follows:

Merchant Pipe.

	Jobbers, carloads. Steel. Black. %	Galv. %
⅛ to ¼ in	65	49
⅜ in	67	53
½ in	69	57
¾ to 6 in	73	63
7 to 12 in	70	55
Extra strong, plain ends:		
⅛ to ⅜ in	58	46
½ to 4 in	65	53
4½ to 8 in	61	49
Double extra strong, plain ends:		
½ to 8 in	54	43

Discounts on Genuine Iron Pipe are as follows:

	Black. %	Galv. %
⅛ and ¼ in	63	..
⅜ in	65	51
½ in	67	55
¾ to 6 in	71	61
7 to 12 in	68	53
Extra strong, plain ends:		
⅛ to ⅜ in	56	44
½ to 4 in	63	51
4½ to 8 in	59	47
Double extra strong, plain ends:		
½ to 8 in	52	41

Boiler Tubes.—The contract for the Locomotive Tubes on the large order for locomotives placed by the New York Central with the American Locomotive Company, aggregating over 1000 tons, has been given to the Worth Brothers Company, Coatesville, Pa. This is the largest single order for Railroad Tubes placed for some time. Some other purchases of Railroad Tubes have recently been made and further business is pending. Discounts on Merchant Tubes for small lots, on which an extra 5 per cent. is allowed in carloads, are as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1½ in	42	47
1¾ to 2¼ in	42	59
2½ in	47	61
2¾ to 5 in	52	65
6 to 13 in	42	59

2½ in. and smaller, over 18 ft. long, 10 per cent. net extra.
2¾ in. and larger, over 22 ft. long, 10 per cent. net extra.

Iron and Steel Scrap.—The market continues dull, and prices generally are weaker. Consumers are not disposed to take in much Scrap, in the belief that the market may go

lower, and for this reason the tonnage that is being sold is quite light. On a firm offer, and for reasonably prompt shipment, it is probable that our prices might be shaded in some cases from 25c. to 50c. a ton. Dealers quote about as follows: Heavy Steel Scrap, $13 to $13.25; No. 1 Railroad Wrought Scrap, $14 to $14.25; No. 1 Cast Scrap, $15 to $15.25; Bundled Sheet Scrap, $10 to $10.25; Cast Iron Borings, $7.75 to $8; No. 1 Busheling Scrap, $13 to $13.25; No. 2, $10.25 to $10.50; Steel Axles, $16.50 to $17; Sheet Bar Crop Ends, $17 to $17.25; Low Phosphorus Melting Stock, $17.25 to $17.50; Iron Axles, $20 to $20.50; Machine Shop Turnings, $8.75 to $9; Rerolling Rails, $14.25 to $14.50; Old Steel Rails, short pieces for Open Hearth use, $13 to $13.25; Grate Bars, $13.25 to $13.50.

Coke.—There is but little demand for either Furnace or Foundry Coke, and more than 50 per cent. of the Coke capacity is shut down at present, and will remain idle until demand improves. Furnace Coke made in the Klondike and Latrobe districts continues to be offered quite freely at $1.60 to $1.65, for prompt shipment, while 72-hr. Foundry Coke is held at $2.10 to $2.25, the higher price being for the best grades. The output of Coke last week in the Upper and Lower Connellsville regions was 160,369 tons. There are 36,590 ovens in these two regions, of which 16,837 were active last week and 19,753 were idle.

William Wieman has been appointed exclusive sales agent for the Sloss-Sheffield Steel & Iron Company in northern Ohio, in addition to representing it in New York State and western Pennsylvania. He is associated with G. P. Bassett, Jr., in a general Pig Iron and Coke business, with offices in the Commonwealth Building, Pittsburgh, Pa.

The offices of the Standard Bridge Tool Company, builder of Bridge and Structural Shop Machinery, have been removed from room 425 Bissell Building to room 709-710 Curry Building, corner Ross street and Fourth avenue, Pittsburgh.

The American Vanadium Company, miner and manufacturer of vanadium, with plant at Bridgeville, Pa., has removed its offices from 303 to 324 Frick Building, Pittsburgh.

The Mark Mfg. Company, Chicago, operating pipe and tube mills at Zanesville, Ohio, has opened a sales office in room 510 Park Building, Pittsburgh, in charge of B. F. Bechtel.

Metal Market.

NEW YORK, March 25, 1908.

Pig Tin.—Business has fallen off to a considerable extent. Buyers are fairly well supplied for present needs, and as they have little faith in the advance are holding off. A marked difference in quotations has been in evidence, on one day ton lots selling below 5-ton lots. Price changes during the week have been as follows:

	Cents.
March 19	30.65
March 20	31.00
March 23	30.87½
March 24	31.50
March 25	32.25 to 32.50

The best day of the week was Thursday. On Monday some sellers liquidated under the London market equivalent, as they had good profits. The reason for the London advance is threefold: It was started by the good buying from America two weeks ago; continued in the hope of securing good prices at the Banca sale to-morrow, and helped by a well defined rumor that a large short interest would have to cover in April. The London market is up about £10 from last week, closing easy at £146 10s. for spot and £144 for futures. The advance of 1c. to-day was the result of the rapid upbidding in London, and there is considerable irregularity to the market.

Copper.—Slowly but steadily advancing prices of Copper Warrants in London helped furnish the initiative for higher prices in America. A better demand from consumers and freer buying caused quotations to advance ⅛c. to ¼c. A fair number of contracts have been made for April delivery of Lake at 13.25c., and some holders are now asking 13.37½c., but no metal has been sold at the latter price. Electrolytic is likewise stronger, most of the week's transactions ranging between 13.12½c. and 13.25c. Nothing is offering to-day under 13.25c. The advance has been quiet and not accompanied by startling rumors of big sales, which generally have the opposite effect from the seeming intent. For want of some better reason to account for the advance, some express the opinion that more reassuring news from Washington has been the cause of it. There is no doubt, however, that sentiment has improved, and not only that more tangible results in the way of orders for electrical equipment are in evidence. These, however, are overrated. Wire business, although somewhat better, is still very quiet. Copper producers are apparently concerning themselves little over the increase in production which will come from Montana shortly, preferring to live in the better conditions of to-day. The greater efficiency of labor is aiding producers in making both ends meet. A recent report, only one of many like incidents, is that 750 men are now getting out as much Ore as 900 did last year. If the advance goes farther rumors will likely be revived of a Copper shortage. Most of the selling companies, however, can ship on four days' notice, and many lose no time in getting cars out. When the present speculative movement in London culminates, this market may be expected to follow that lead as it has done on the advance. Buying by European melters is light, they being well supplied with Copper for six weeks at least. Exports so far this month are 17,165 tons. The London market closes easy, but about £1 above a week ago, at £60 7s. 6d. for spot, £60 15s. for futures and £63 10s. for Best Selected. L. Vogelstein & Co., agents for Aron Hirsch & Sohn, Halberstadt, Germany, give the German consumption of foreign Copper for January, 1908, as 14,160 tons, compared with 8332 tons during January, 1907.

Pig Lead.—A few stray lots in the market early in the week were rapidly picked up at 3.97½c., New York, and since then the market has been steady, at 4c., New York, and 3.85c., St. Louis. Although business is dull, there is little Lead offering by outside producers.

Spelter.—This metal has not shared in the general advance, and while there is considerable difference between quotations, they are on the whole lower. Prime Western brands can be had at 4.75c., New York, and 4.55c., St. Louis.

Aluminum.—The old quotations of 33c. for No. 1 Ingots and 32c. for No. 2 Ingots continue. Dealers importing this metal, although without stocks here, express the belief that they will be able to take large orders at lower figures.

Antimony.—Dullness continues to rule and prices are nominal, at 9.50c. for Cookson's and 8.50c. for outside brands. Hallett's is purely nominal, because there is little of that brand here.

Nickel.—Quotations are unchanged, at 45c. for ton lots and 55c. to 60c. for smaller quantities.

Ferroalloys.—Only a light inquiry is in evidence, and consumers are doing considerable shopping even for small orders. The price of 50 per cent. Ferrosilicon is so low—$77 seaboard and $79 Pittsburgh—that manufacturers are talking of closing their works. Ferromanganese is quoted at $44, but this price is reported to have been shaded.

Tin Plate.—The American Sheet & Tin Plate Company is operating about 75 per cent. of its Tin Plate capacity, and specifications on Bright Plates are coming in rather more freely. The leading American user of foreign Tin Plates is taking Plates as rapidly as they are laid down on the dock. Prices are unchanged, at $3.89, New York, and $3.70, Pittsburgh, for 100-lb. I. C. Coke Plates. Prices of Welsh Plates in Swansea are again 1½d. higher, at 12s. 6d.

Old Metals.—The demand, although showing improvement, is not brisk. Prices, however, are higher, because of advancing quotations for Copper. Dealers' selling prices are as follows:

	Cents.
Copper, Heavy Cut and Crucible	12.50 to 13.00
Copper, Heavy and Wire	12.50 to 12.75
Copper, Light and Bottoms	11.50 to 11.75
Brass, Heavy	9.50 to 9.75
Brass, Light	7.50 to 7.75
Heavy Machine Composition	11.75 to 12.00
Clean Brass Turnings	8.25 to 8.50
Composition Turnings	9.00 to 10.00
Lead, Heavy	3.80
Lead, Tea	3.55
Zinc Scrap	3.50

Iron and Industrial Stocks.

NEW YORK, March 25, 1908.

The stock market has continued under the influence of stimulating conditions. The annual report of the United States Steel Corporation was in itself a strong showing for the stocks of that company, while reports from Washington were of a more agreeable character, and Supreme Court decisions promised checks to aggressive legislation against railroads. Stocks consequently showed a steadily advancing tendency from day to day, reaching points higher on Tuesday than at any time since the present rise began. The range of prices on active industrial stocks was as follows from Thursday of last week to Tuesday of this week: Steel common 32½ to 36¼, preferred 96½ to 100; Car & Foundry common 29½ to 33, preferred 89½ to 91½; Locomotive common 36¼ to 43¾, preferred 92 to 93; Steel Foundries common 5½, preferred 30⅝ to 31¾; Cambria Steel 28¼ to 29⅝; Colorado Fuel 19⅛ to 23⅛; Crucible Steel common 5 to 5⅛, preferred 35½ to 36½; Pressed Steel common 22 to 25½, preferred 78 to 80½; Railway Spring common 32 to 36; Republic common 17½ to 19½, preferred 70⅜ to 73, ex-dividend; Sloss-Sheffield common 50 to 52; Cast Iron Pipe common 21 to 23⅛, preferred 69½; Can common 5, preferred 47 to 49¾. Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 35⅛, preferred 99¼, bonds 95; Car & Foundry common 32¾, preferred 91½; Locomotive common 44¼, preferred 94; Colorado Fuel 22⅜; Pressed Steel common 24, pre-

ferred 81½; Railway Spring common 36; Republic common 19, preferred 72½; Sloss-Sheffield common 50½; Cast Iron Pipe common 26, preferred 71¼; Can common 5, preferred 50¼.

The semiannual financial statement of the Lake Superior Corporation for the six months ended December 31 shows earnings of the subsidiary companies as follows:

Gross earnings	$5,393,601
Expenses	4,559,412
Net earnings	$834,189
Interest on loans	93,123
Interest Lake Superior first mortgage bonds	214,000
Balance	$526,066

The balance as above, $526,066, compares with $29,030 for the fiscal year ended June 30 last and $556,880 for the year 1906. The full 5 per cent. dividend on the $3,000,000 income bonds, payable October 1, calls for $150,000 yearly. The floating debt is now $500,000 less than a year ago. The annual meeting, which has been adjourned from time to time because of the injunction preventing the vote on 50,174 shares of stock held as collateral, will be held April 6.

Dividends.—Directors of the Westinghouse Air Brake Company, Pittsburgh, met last week and declared a quarterly dividend of 2½ per cent. For the preceding quarter 2½ per cent. regular and 2½ extra was paid. Last year the stock paid dividends of 20 per cent. In 1906 the dividends paid aggregate 22½ per cent.; in 1905, 20 per cent.; in 1904, 21 per cent.; in 1902 and 1903, 24 per cent., and in 1901, 18 per cent. In 1895 dividends of 22½ per cent. were paid; in 1896, 40 per cent.; in 1897, 35 per cent.; in 1899, 25 per cent., and in 1900, 30 per cent. In December, 1907, a stock dividend of 25 per cent. was declared. The company declared a stock dividend of 25 per cent. in December, thus increasing the capital from $11,000,000 to practically $14,000,000. It was not expected that dividends at the 20 per cent. rate could be maintained under existing conditions.

The American Shipbuilding Company has declared a quarterly dividend of 1¼ per cent. on the preferred stock.

The Central Coal & Coke Company has declared a quarterly dividend of 1¼ per cent. on the preferred stock and 1½ per cent. on the common stock, payable April 15.

The recent statement in this column that the Standard Screw Company, Worcester, Mass., had declared a quarterly dividend of 1¾ per cent., payable March 31, was an error. The dividends of the company are paid semiannually, in January and July.

New York.

NEW YORK, March 25, 1908.

Pig Iron.—There have been a number of sales of fairly round lots to the general foundry trade and to Pipe shops, the aggregate being placed at close to 15,000 tons. Included in this is one lot of 2000 tons for delivery at Troy, N. Y., at $17.25 for No. 2 Soft. Alabama and Virginia makers are underselling the majority of Northern furnaces and are penetrating inland to an unusual extent. We quote at tidewater as follows: No. 1 Northern Foundry, $18 to $18.50; No. 2 Foundry, $17.50 to $18, and No. 2 Plain, $17 to $17.50. Southern Irons are $17.25 to $17.50 for No. 1 Foundry and $16.25 to $16.50 for No. 2 Foundry.

Steel Rails.—The New York Central order for 24,000 tons, placed with the Lackawanna Steel Company, is the only large business of the week. It is understood that the same road is negotiating also with one or two other companies. Through the R. C. Hoffman Company, Baltimore, the Pennsylvania Steel Company has taken 2200 tons of 70-lb. Rails for Panama Canal work. These will be rolled at Sparrows Point. An inquiry is up this week for 1500 tons of Rails for Subway work in Greater New York. More figuring on Standard Rails is reported, and the delay with some roads is due to decisions that must be made in connection with proposed new sections. The turning up of rolls for these will require some time after the business finally gets to the mills.

Structural Material.—The conditions are reported somewhat better, and more work is in sight than was the case a few weeks ago. In New York City the decision to close the Fifth Avenue Hotel April 1 marks the practical placing of a contract for the office building that will take its place. The number of stories is not fixed as yet, but it is believed 6000 or 7000 tons of Steel will be needed. An addition to the new Hotel Astor will require about 4000 tons, and plans are already completed. A building at 18 East Twenty-seventh street is also being figured on. In outside work, interest is being taken in the projected Bureau of American Republics Building, at Washington, D. C., and the Regents' Building, estimated to cost $3,500,000, at Albany, N. Y. A number of public buildings in various parts of the country are projected. Bridge contracts are few of late. The Lehigh Valley is figuring on seven small bridges and a viaduct that will call for 800 or 900 tons of Steel, and the Lackawanna expects to build several bridges of moderate size. The Structural mills are running with a shade greater activity, and expectations are entertained of better things as spring work advances. We continue our quotations on tidewater deliveries, shipments from mill: Beams, Channels, Angles and Zees, 1.86c.; Tees, 1.91c. On Beams, 18 to 24 in., and Angles over 6 in., the extra is 0.10c. Material cut to length is sold from stock at 2¼c. to 2½c.

Bars.—While Eastern manufacturers have not changed the nominal price on Bar Iron, which continues at 1.50c., Pittsburgh, or 1.66c., tidewater, quite a number of mills are selling on the basis of 1.40c., Pittsburgh, or 1.56c., tidewater. The demand is quite light for either Iron or Steel Bars. Manufacturers of Steel Bars are quoting 1.60c., Pittsburgh, or 1.76c., tidewater.

Plates.—General business continues quiet. Some of the mills, however, will doubtless secure quite a quantity of new work, as a result of the large contract for locomotives recently placed by the New York Central Lines. It is intimated that other locomotive orders are to come out in good quantity, which will still further improve the condition of mills rolling Plates for such purposes. Prices are unchanged, as follows, on standard sizes of Plates at tidewater: Sheared Plates, 1.86c. to 1.96c.; Flange Plates, 1.96c. to 2.06c.; Marine Plates, 2.26c. to 2.36c.; Fire Box Plates, 2.75c. to 3.50c., according to specifications.

Cast Iron Pipe.—The city of Reading, Pa., opened bids yesterday on about 2000 tons of Water Pipe. The Brooklyn Union Gas Company will this week place orders for 3000 tons of Gas Pipe. New York City, having made financial arrangements, is now beginning to purchase Water Pipe for the coming season's needs, but the opening orders only cover small quantities. Outside of carload inquiries not much business is being done. Municipalities generally and private corporations as well are finding difficulty in securing funds for extensions, and are therefore not yet in position to undertake such work as has been contemplated for the year. While prices show no betterment, the Pipe manufacturers are resisting the declining tendency. Carload lots of 6-in. are quoted at $23.50 to $24 per net ton, at tidewater.

Old Material.—More inquiries are being received for Relaying Rails than for almost any other Old Material. As spring is now opening and outdoor operations are being taken in hand, contractors and others are making preparations for operations which involve the use of Rails. Parties who would naturally be inclined to purchase new Rails are now economizing by buying Relaying Rails, as they require the investment of much less money. Foundries are doing a little better than they were, but still they are not taking any large quantities of Cast Scrap, a 100-ton order being looked upon as good business. As far as can be ascertained, nothing is being done in the purchase of Steel Scrap, while the Bar mills are buying rolling mill stock in exceedingly limited quantities. We quote as follows, per gross ton, New York City:

Old Girder and T Rails for melting	$9.50 to $10.50
Heavy Melting Steel Scrap	9.50 to 10.50
Old Steel Rails, rerolling lengths	11.00 to 12.00
Relaying Rails	19.00 to 20.00
Old Iron Rails	14.00 to 15.00
Standard Hammered Iron Car Axles	16.50 to 17.50
Old Steel Car Axles	14.00 to 14.50
No. 1 Railroad Wrought	12.00 to 13.00
Iron Track Scrap	9.50 to 10.50
No. 1 Yard Wrought, long	10.50 to 11.50
No. 1 Yard Wrought, short	9.50 to 10.50
Light Iron	5.00 to 6.00
Cast Borings	4.50 to 5.50
Wrought Turnings	6.00 to 7.00
Wrought Pipe	9.00 to 10.00
Old Car Wheels	15.50 to 16.50
No. 1 Heavy Cast, broken up	13.50 to 14.50
Stove Plate	11.50 to 12.50
Grate Bars	9.50 to 10.50
Locomotive Grate Bars	10.00 to 11.00
Malleable Cast	11.50 to 12.50

The Philadelphia Supply and Machinery Dealers' Association held its second annual banquet at the Bellevue-Stratford Hotel on the evening of March 19, with quite a large attendance. An informal reception was held by the officers of the association prior to the banquet, which was served in the Clover Room. President Alfred M. Maddock, of Maddock & Co., acted as toastmaster. In his introductory remarks he stated that the association is now entering its third year and is gaining in strength steadily. Its usefulness has been shown by the friendly spirit which has characterized the meetings. The lack of confidence which was at first shown by those in the trade is rapidly disappearing, and it is realized that the interests of the members, as far as business is concerned, are identical, and that co-operation and not competition is the life of trade. He called upon Louis Pelletier, of the Industrial Press, New York, who made a brief address on the status of the machinery trade generally. August A. Miller, of *The Iron Age*, Philadelphia, followed with a few remarks on the local and general conditions governing the machinery market. The concluding feature of the banquet was an enjoyable vaudeville entertainment, given under the personal direction of Frank Clouds, of Powell, Clouds & Co.

The National Metal Trades Convention.

About 200 members of the National Metal Trades Association were present at the Hotel Astor, New York, to open their tenth annual convention on Wednesday morning. The Administrative Council had been in session for two days winding up the affairs of the present administration and making final arrangements for the two days' convention.

The Alumni Banquet.

The annual banquet of the officers' alumni was held on Tuesday night in one of the private dining rooms at the Hotel Astor, when an old-fashioned grandfather's hall clock was presented to President Barker by those who attended. Among those present were: W. D. Sayle, H. N. Covell, H. P. Eells, Robert Wuest, William Lodge, F. A. Geier, F. K. Copeland, Charles E. Hildreth, P. B. Kendig, A. H. Bullard, O. B. Kinnard, George Garvin, A. E. Falkenau, W. L. Pierce, P. W. Gates, A. W. Hoyt, J. Kirby, Jr., George Steadman, William Taylor, Ernest Du Brul, M. K. Bowman, N. W. Dingwall, John R. Back, J. H. Schwacke, M. H. Barker, F. H. Stillman and J. W. Reynolds. The clock was presented by Mr. Covell, who in a neat speech referred to Mr. Barker's activity in promoting the affairs of the association. The presentation came as a surprise to Mr. Barker, but he managed to make an appropriate response. The banquet was presided over by Mr. Sayle, and those who spoke in response to his call were Messrs. Taylor, Steadman, Du Brul, Lodge, Geier, Hoyt, Back and Copeland.

The First Session of the Convention.

At the opening of the convention Patrick H. McGowan, acting Mayor of New York City, delivered the address of welcome. The roll call, reading of the minutes, &c., were dispensed with, and the association got down to business promptly by the naming of the following committees:

NOMINATING: H. N. Covell, Lidgerwood Mfg. Company, New York; J. W. Gardner, Gardner Governor Company, Quincy, Ill.; W. D. Sayle, Cleveland Punch & Shear Works, Cleveland, Ohio.

AUDITING: F. C. Caldwell, H. W. Caldwell & Son Company, Chicago, Ill.; J. W. Glover, Glover Machine Works, Marietta, Ga.; Frank E. Hoadley, Farrell Foundry & Machine Company, Ansonia, Conn.

CONVENTION: W. D. Sayle, Cleveland Punch & Shear Works, Cleveland, Ohio; Henry D. Sharpe, Brown & Sharpe Mfg. Company, Providence, R. I.; Exile Burkitt, H. Jackson Engine Company, Jackson, Tenn.; F. S. North, Union Special Machine Company, Chicago, Ill.; E. C. Page, Page-Storm Drop Forge Company, Brightwood, Mass.

WAYS AND MEANS: Wm. Kehoe, Wm. Kehoe & Sons, Savannah, Ga.; A. H. Bullard, Bullard Machine Tool Company, Bridgeport, Conn.; C. S. Bonsall, Buckeye Engine Company, Salem, Ohio; E. H. Hargrave, Cincinnati Tool Company, Cincinnati, Ohio; E. W. Heyl, Heyl & Patterson, Inc., Pittsburgh, Pa.

HOURS AND WAGES: L. H. Kittredge; S. P. Egan, J. A. Fay & Egan Company, Cincinnati, Ohio; George F. Steadman, Curtis & Co. Mfg. Company, St. Louis, Mo.

STRIKES AND LOCKOUTS: E. P. Robinson, Atlantic Works, East Boston, Mass.; A. L. Lovejoy, Becker-Brainard Milling Machine Company, Boston, Mass.; C. H. Cowdrey, Fitchburg, Mass.; W. S. Hallowell, Harrison Safety Boiler Works, Philadelphia, Pa.

CONSTITUTIONAL AMENDMENTS: H. N. Covell, Lidgerwood Mfg. Company, New York; F. K. Copeland, Sullivan Machinery Company, Chicago, Ill.; J. Kirby, Jr., Dayton Mfg. Company, Dayton, Ohio; J. H. Schwacke, Wm. Sellers & Co., Inc., Philadelphia, Pa.; E. P. Robinson, Atlantic Works, East Boston, Mass.; J. C. Hobart, Triumph Electric Company, Cincinnati, Ohio.

President M. H. Barker in his annual report congratulated the association upon its steady growth during the last year, stating that although 118 names were dropped from the rolls and only 101 have been added, he considered the association has been a gainer by the change. This he attributed to the fact that the names added are all of concerns that will be a great help and benefit to the organization. Speaking of business conditions of the last year he said:

I wonder sometimes if the Machinists' Union thinks it has accomplished one of the objects it has been working for—namely, the 8-hr. day. It has certainly come in many shops, not only of our members, but those outside as well.

The past year has been a hard one for the officers and more especially Commissioner Robert Wuest. I have many times wished I had no other business but matters of the association to take my attention. I am very strongly convinced that our association should, as soon as possible, secure the services of a good, strong man, one who could devote his entire time to the business of the association and be made a permanent president, or, rather, elected for a term of years. I for one should like to see such a man made president of the two sister associations, the National Metal Trades Association and the National Founders' Association, and then let him conduct the affairs of both associations, and have a separate organization otherwise for each. Think this matter over, gentlemen, and I know you will see the wisdom of the suggestion.

After again referring to the excellent work of the commissioner and showing how economically the great work of the year had been performed, Mr. Barker outlined the doings during the year of the Administrative Council. He said: "At the first meeting of your Administrative Council, held at Boston in March, 1907, the council voted that the president should appoint a committee of three, who, with the president, should constitute an Executive Committee, to meet once a month and to have charge of the business of the association, as far as it could do so under the constitution and by-laws. Your president appointed on this committee Messrs. C. Bermingham, Howard P. Eells, Paul B. Kendig and W. H. Pfahler. The committee has held eight meetings during the year and it has been of great help, not only to your president and commissioner, but to the whole association."

He paid a touching tribute to former Commissioner William P. Eagan, who died at Pasadena, Cal., on June 26, 1907. He referred to the appointment of Nelson W. Dingwall to the post of secretary of the association and complimented the new secretary upon his efficient work.

After reviewing the efforts to bring the National Metal Trades and National Founders' associations into closer relations, he said that the committee in charge of the work reported another agreement, which provides for a joint committee of three, appointed from each Administrative Council and including the two presidents. This joint committee is to meet at least four times each year, and is to be called a Conference Board. For the Metal Trades Association F. K. Copeland and John Kirby, Jr., were appointed, with Wm. M. Taylor and John R. Back as alternates. This board has held three meetings, and has appointed F. W. Hutchings, secretary of the National Founders' Association, as its secretary. The board has taken up matters of labor legislation at Washington, and has appointed Marshall Cushing, formerly secretary of the National Association of American Manufacturers, to represent the two associations at the capital and watch the actions of the labor leaders and labor legislation there. Mr. Cushing is under the direct control of the presidents of the two associations, and is doing excellent work.

The report of Commissioner Robert Wuest showed the organization to be in a flourishing condition as regards its ability to combat labor difficulties. He stated that a determined attempt was made in the spring of last year by the International Association of Machinists to disrupt the organization by calling a number of strikes in a widely scattered territory. In all, 126 strike cases against members of the association were reported during the year, of which 98 were officially defended by the organization. The home office succeeded in shutting off 13 of the cases reported before they became active. The commissioner also reported on the movement to organize a Federation of Metal Trades Association, which resulted from a meeting of representatives of national organizations of metal trades labor unions at Cincinnati last February, as was reported in *The Iron Age*.

Mr. Wuest deplored the fact that the strength of the majority of the labor organizations is in railroad shops, the management of which, the commissioner stated, seems to favor the agreement method of dealing with labor disputes. The report included the statement that if the success of the organization in dealing with strike problems was generally known among manufacturers eligible to membership, the association would have a rapid growth

The Machinery Trade.

NEW YORK, March 25, 1908.

Some houses report a slightly better demand for machinery, while others, particularly dealers in machine tools, say that business with them shows practically no improvement. The business received has come from scattered sources and those who secured a fair portion of the few orders placed feel somewhat encouraged, but on the whole it cannot be said that trade has increased to a noticeable degree. As for some weeks the buying covered small lots of tools for the less important industrial plants, the larger interests having not yet come into the market, except in a few isolated cases, and then for only a few tools. The volume of inquiries received was not large, and none was of sufficient importance to indicate a much greater demand in the immediate future. In the West inquiries have been received from the Chicago, Milwaukee & St. Paul Railroad for a fair sized list of machine tools.

The demand for power plant equipment continues more active than that for machine tools, the number of new projects coming up daily constantly adding to the amount of machinery required. Many of the new propositions are water power developments, and among the more recent for which a large amount of machinery will be required is the Central of Georgia Power Company, Macon, Ga., which intends to develop the water power of middle Georgia. The company has lately obtained permission to issue $16,000,000 of bonds and $20,000,000 in stock, and W. J. Massee, president of the company, is now in New York in connection with the project. Plans have not yet been prepared, and it will probably be a month or so before they are in such shape that the company will be in a position to know the amount of machinery that it will require. It is expected that the entire development will entail the expenditure of several millions of dollars.

The New York Central Railroad has instituted some new arrangements in its purchasing agent's office, and as a result of the changes all the buying done by the company will be practically under the supervision of an auditing committee composed of three officers of the railroad. The Central continues to send out inquiries for small requirements, and is now asking the trade to bid on a motor driven bulldozer and motor driven iron bolt shears.

The Gifford-Wood Company, Hudson, N. Y., manufacturer of ice tools, has inquiries in the trade covering equipment which is to be installed in extensive additions the company expects to make to its plant. Work will be commenced on the new buildings within a few weeks, and they will consist of a boiler and engine room, 25 x 46 ft.; one-story foundry, 84 x 100 ft.; storage building, 40 x 76 ft.; pattern shop and carpenter shop, 100 x 110 ft.; forge shop, 100 x 130 ft.; manufacturing building, 50 x 100 ft., and an office building, 50 x 90 ft. The company will need about 100 hp. of power equipment.

The Eberhardt Brothers Machine Company, Newark, N. J., has received a good sized order for gear cutting machines from the National Transit Company, Oil City, Pa. The company reports a substantial increase in orders, particularly from the Middle West. The National Transit Company, a subsidiary of the Standard Oil Company, is making extensive improvements at Oil City, including the construction and equipment of several large buildings, which will necessitate the installation of a large amount of machinery. The trade has already received some good business from the Standard Oil Company for its new plant at Bayway, N. J., and as the company is going ahead with the improvements both at Bayway and Oil City, it is likely that considerable additional business will be secured.

The Heindel Mfg. Company, Hanover, Pa., recently incorporated with a capital stock of $200,000, has taken over the plants of the Heindel Mfg. Company and the old American Foundry & Machine Company, located between the Western Maryland and Pennsylvania railroads. The company has about completed a new building, 93 x 430 ft., of steel and brick construction, to be equipped with electric traveling cranes, and intends to install about $40,000 worth of machine tools and new cupolas.

The Heddon Iron Construction Company, 22 Clinton street, Newark, N. J., whose plant at Bloomfield, N. J., was recently destroyed by fire, has erected temporary buildings for carrying on its work until new buildings can be designed and erected. The company expects to build a modern shop in the near future, with the latest improved machinery for structural and ornamental ironwork. The dimensions of the new buildings and the amount and character of equipment that will be required have not yet been decided upon.

The washing plant of the Dominion Coal Company at Glace Bay, N. S., was recently destroyed by fire and the company has under consideration several plans for rebuilding it. A change of location is also under consideration. Until these matters are settled the company will not be in a position to state what new equipment will be required.

The engineering firm of Seymour & Whitlock, New Jersey Railroad avenue, Newark, N. J., is doubling its plant, at an expense of about $17,000, and it is expected that before long the firm will be buying machinery equipment. The firm manufactures special machinery and acts as consulting and designing engineer for all such work.

It is probable that the Williams Engineering & Contracting Company, 13 Park row, New York, will need some contractors' equipment for use on the construction of a dry dock at the Brooklyn Navy Yard, for which it has been awarded a contract amounting to $764,400. The contract was taken out with a proviso that if Congress appropriates an additional $500,000 for the work the dock will be made 50 ft. longer than the plans now call for.

The Kenilworth Water Company, 220 Broadway, New York, is asking bids for the installation of a water works system at Kenilworth, N. J., consisting of a water tower, pumping station and about 6 miles of pipes, at an estimated cost of $35,000. C. C. Vermeule is consulting engineer.

The Department of Water Supply, Gas and Electricity, New York, will receive bids until April 1 for completing the work to be done under the contract for furnishing, delivering, erecting and connecting four water tube boilers at the Ridgewood pumping station in Brooklyn. The contract was left unfinished and has been abandoned by the company which secured the original contract for the work under date of January 2. The department will also receive bids until April 8 for four water tube boilers, with economizer, feed water heaters and all appurtenances, for the boiler room of the 179th street pumping station, Manhattan. The time allowed for the completion of this contract is 150 days, and the security required is $20,000.

Philadelphia Machinery Market.

PHILADELPHIA, PA., March 24, 1908.

Business in the local machinery market has been rather light, although there has been some little increase in inquiries. The demand continues to be almost entirely confined to the smaller propositions, and mostly for single tools. The trade, however, feels more hopeful as to the future, not that any large volume of business is expected to develop, but rather that the small business which has been coming out from week to week will gradually increase as the spring advances. The railroads in this territory show no indications of placing orders for machine tools in the immediate future; in fact, it is reported that some railroads have adopted a policy of supplying deficiencies in some shops from others on their lines, which at the time are either idle or less actively engaged.

There is little inclination on the part of industrial concerns to purchase equipment in any quantity, the policy being to reduce expenditures to the lowest possible point, and when requirements make it necessary to make purchases the market is carefully scrutinized for the best available price and delivery. Prices, however, are being pretty firmly held, particularly in the better grades of tools, although small concessions are sometimes learned of on other grades. But little difficulty is being experienced as far as deliveries are concerned. Dealers in most cases are pretty well stocked up, and manufacturers, while not overstocked as a rule, can usually make prompt deliveries on any of the regular lines of tools.

Manufacturers do not experience much change in conditions. Orders on hand are being cleaned up to some extent, and this business, together with what little comes in from day to day enables plants to continue in operation at a restricted basis. New business comes out irregularly, however, and while some few builders have taken on a little more business in the aggregate, others have not done as well. On the average plants are maintained in operation on about a 50 per cent. basis.

There has not been much improvement in the foreign demand. In some few special lines a little more business has been offered, but the number of orders booked have usually been extremely small.

The second-hand machinery market shows more activity. Inquiries have been more numerous, and there is some disposition shown by buyers to purchase in this field rather than take new tools. In some cases, it is said, tools as good as new can be had at prices which are attractive. Some concerns have adopted a policy of disposing of their surplus tools at this time, and lists have, in instances, been sent the trade showing the various tools which they desire to dispose of. Most of the business coming to the dealers is of a day to day character, and while individually small the aggregate makes a fairly good total, when existing conditions are taken into consideration. The demand for boilers and engines shows practically no change. Inquiries are not numerous and the amount of business being closed is small.

Iron and steel castings continue in light demand, the business placed being of a miscellaneous character. Consumers are ordering only such castings as may be required to

complete orders on hand. Plants continue to operate on materially reduced capacities, and while gains are made in some directions, they are largely balanced by a falling off in others, so that on the average no material improvement in foundry conditions is to be noted.

The Midvale Steel Company, which has a large quantity of Government work on its books, is operating its plant with about 80 per cent. of its normal payroll, and has sufficient work on hand to maintain close to that percentage for some five or six months.

The Reading Railway Company has been purchasing considerable property in the neighborhood of Eighth and Noble streets and contemplates the establishment of an extensive freight station and yard at that location.

A company has recently been organized at York, Pa., to construct an electric railroad from Shrewsbury to York, via Glen Rock, Hummeltown, Logansville and Jacobus. D. B. Goodling, Logansville, is president; J. H. Keller, Shrewsbury, secretary, and J. L. Meyers, Glen Rock, Pa., treasurer.

Bids have been opened by the Assistant Director of Public Works, city of Philadelphia, for the installation of two centrifugal auxiliary pumping engines at the Torresdale filter plant, each having a capacity of 5,000,000 gal. per day; also for pump ends and pipe connections for the Lardners' Point pumping station. Bids for the pumping engines are as follows: Doyle & Co., $6510; D'Olier Engineering Company, $6475; Walson & Stillman Company, $5700; Walter Wood, $5850 and $5070; Allis-Chalmers Company, $9730. The last named bid is for the two pumps. Awards will be made at a later date.

The same department will receive bids until April 7 for furnishing, under what is known as contract No. 143, pump ends for the Belmont pumping station. Specifications may be obtained from the office of the Chief of the Bureau of Water, Room 790 A, City Hall, to whom all communications should be addressed.

Sealed proposals for furnishing material and constructing a system of pipe lines for the Borough of Verona, N. J., will be received in the Council Room in that borough until 8 p.m. March 30. The work will include the furnishing of 1000 tons of cast iron pipe, fire hydrants, valves, &c. Specifications regarding the work to be done may be obtained from the engineer in charge, W. E. Sexton, 46 North Twelfth street, Philadelphia, Pa., or from D. H. Slayback, Verona, N. J.

The Common Council of the city of Philadelphia, at a recent meeting, passed a bill authorizing a new $10,000,000 loan for municipal improvements. This will have to pass the Select Branch of the Council at its next meeting on April 2, which is practically assured. Some of the purposes on which the new loan will be applied are as follows: New school houses and sites, $2,500,000; water filtration, $800,000; sewers, $1,100,000; high pressure fire mains, $500,000; bridges, $600,000.

The Philadelphia & Reading Railway Company will, it is said, be ready to receive bids in the near future on that section of work in connection with the elevation of its Ninth street tracks, which includes the portion between Green and Berks streets. This will include the building of a four-track viaduct and will necessitate a considerable quantity of materials and equipment. A freight yard is also to be constructed at Ninth and Master streets, which is in the above mentioned section.

Cleveland Machinery Market.

CLEVELAND, OHIO, March 24, 1908.

The volume of new business in the machinery and machine tool trade is still very light, and it cannot be said that there has been any improvement during the past week. The sales by dealers have been in most cases single tools in small and medium sizes, the largest orders being for not more than three tools. Inquiries are fairly good, both with the tool dealers and tool builders. In fact, there has been a satisfactory volume of inquiries for the past three or four weeks, but orders have been very slow in materializing, and the amount of buying has not been nearly as large as dealers would ordinarily expect from the number of inquiries.

Some of the local tool builders report a slight improvement in their sales, and the outlook with many of them is much brighter than it was a few weeks ago. After being taxed to their utmost for a year or two and delaying needed changes, many industrial plants are taking advantage of the present lull to overhaul their equipment and bring it up to the highest point of efficiency by putting in more modern machinery. This movement to reduce the cost of production by the installation of the latest labor saving machinery has brought to the machine tool builders quite a number of orders for special machinery. Tool builders are receiving no inquiries from the railroads and are looking for very little business from that source during the present year. While prices are as a rule being maintained by both dealers and builders, the competition among the latter for some orders that have been pending outside of this territory has resulted in price concessions.

The demand for heavy machinery shows practically no improvement. One builder of locomotive cranes reports the receipt of several orders from Canada, and that it is getting more business in that line from Canada at the present time than in domestic orders.

There is a fair demand for second-hand tools, but the supply is still quite limited and local dealers are on a sharp lookout for good second-hand tools.

The general manufacturing situation shows a slight improvement in the majority of lines. While plants in some industries that were most severely affected during the recent depression are finding the recovery slow and are not running on over half of their full capacity, other industries have so far recovered that plants are running with practically their full force of men. Considerable change is noticed during the past month in the activity of the majority of manufacturing plants to get business. The managers realize that there is a certain amount of business to be had and there is hustling everywhere to secure orders.

There is an increase in the number of new concerns incorporated in this territory to engage in the metal trades, and these new projects, if carried out, will help the machinery market. Promoters of new enterprises, however, are still having considerable trouble in financing their undertakings.

The local jobbing foundry business shows only a slight improvement, and low prices are being named in the strong competition to secure the limited amount of business. In most cases users of castings are placing orders only for their immediate needs.

The Massillon Foundry & Machine Company, Massillon, Ohio, has purchased the business, plant, patterns, patents, &c., of the Lane Tool Company of Cleveland, maker of forge and drop hammers. The Cleveland plant will be removed to Massillon and installed in an addition that will be erected to the plant of the Massillon Company. The addition will be 60 x 130 ft. The contract for the building has been closed and it is expected that the removal will take place about May 1. The taking over of the Cleveland plant will mean an important addition to the products of the Massillon Foundry & Machine Company, which now makes sand rolls and friction hoists for quarries, industrial cars and other equipment for coal mines, and does general foundry work. The plant has been running on full time nearly all winter.

The National Sanitary Mfg. Company has just been incorporated at Salem, Ohio, with a capital stock of $200,000, and as soon as estimates can be secured and contracts closed will begin the erection of a large plant for the manufacture of metal porcelain enameled ware, including bathtubs, lavatories, sinks and other enameled goods. Some time ago several Pittsburgh men, among them Edward Baillie, formerly of Salem, began to look for a site for the projected plant, and the Salem Board of Trade took up the matter and succeeded in securing the location of the industry in that city. The company has purchased 14 acres of land opposite the Pennsylvania Railroad passenger depot, having 1400 ft. along the right of way of the railroad. Two buildings will be erected, each 60 x 200 ft. One will be used for the foundry and cleaning departments, and the other for the polishing, enameling and shipping departments. The new company has effected its organization by the election of the following officers: Frank G. Borden, president; S. Grove, Jr., vice-president; D. W. Davis, secretary and treasurer, and Edwin Baillie, general manager.

The stockholders of the Fover Steel Stamping Company, Painesville, Ohio, will hold a meeting April 24 to consider the question of changing the name of the company and of increasing the capital stock from $60,000 to $100,000. The company now manufactures small metal specialties, but it is proposed to change the line of manufacture to wheelbarrows, dump carts, wagons and other similar products. The present plant will probably be greatly enlarged and considerable new machinery added. W. J. Springborn, president of the Board of Public Service, Cleveland, is president of the company.

With a capitalization of $75,000 the Diamond Heating Company, Akron, Ohio, has been incorporated to manufacture a new furnace. It is reported that the company will establish a plant at Creston, Ohio. The incorporators are Cecil A. Armstrong, Delbert B. Ports, James L. Zaring, O. C. Robinson and R. E. Hall.

The Lake Erie Forging Company, Cleveland, has been incorporated, with a capital stock of $10,000, by John A. Markley, who was formerly connected with the Crucible Steel Forge Company of this city; John C. Kapka, W. H. Harker, Clara K. Markley and H. G. Powell.

Plans for an addition to the power plant of the Cleveland Worsted Mills Company have been prepared by George S. Rider & Co., consulting engineers. The only equipment to be purchased will be two 500-hp. water tube boilers. These have been contracted for.

The G. H. Williams Company, Cleveland, builder of clam shell buckets, reports a fair run of orders and many inquiries. The company has contracted with E. M. Beatty & Sons, Ltd., Welland, Ont., to manufacture its buckets for the Canadian

trade, the castings being furnished by the Cleveland company. The company has just secured a contract to build a revolving derrick, capable of handling a clam shell bucket of 2½ yd. capacity at a 50-ft. radius, for the Builders Supply & Sand Company, Erie, Pa., which has also placed an order with the Empire Shipbuilding Company, Buffalo, for a boat 135 ft. long, with 32-ft. beam, for hauling sand and gravel.

The Republic Stamping Company, Canton, Ohio, is not complaining of industrial depression. The volume of orders has been sufficient to keep the plant running at full capacity, and the company will shortly install some additional equipment in order to increase its output to supply the increased demand. The company manufactures enamel ware.

The Canton-Hughes Pump Company, Canton, Ohio, reports that it has a large volume of orders on its books. During the period of depression the company's plant was not shut down and now nearly the full force is being employed. Since February 1 the plant has been operated on a 10-hr. schedule.

A recent item in this column concerning the purchase of the Akron Clutch Company, including machinery, patents and good will, by the Williams Foundry & Machine Company, Akron, Ohio, was in error in stating that the business would be continued by the Akron Clutch Company. The Akron clutch will continue to be manufactured by the Williams Foundry & Machine Company, which will combine the plant recently taken over with its own.

Chicago Machinery Market.

CHICAGO, ILL., March 24, 1908.

Aside from the development of prospective business in the way of inquiries, but little progress toward advancement has been made in the machine tool market during the past week. As the season advances, however, signs of increased activity continue to multiply. The scattered orders for tools which constitute the chief movement at the present time continue to come from the small industrial centers throughout the West. It is noted that buyers of such equipment are nearly always prepared to pay cash for their purchases, which is significant of easier financial conditions throughout this region. Collections, too, are fairly good, and reports of financial embarrassment are gratifyingly few considering the long continued strain of dullness. Here and there machine tool factories are fairly well supplied with orders, but generally they are running very light. While it may be safely said that on the whole there is some improvement, it is not pronounced enough as yet to be regarded as an indication of permanent betterment. The market seems to be actuated by spasmodic spurts, as a result of which there is a good deal of fluctuation observed in the week to week reviews of transactions. This feature of market movements makes it difficult to judge with accuracy the general trend of trade, and the uneven distribution of business tends to influence the views of the various interests according to the degree in which they have participated in it. No sales of special importance are reported for the week, and shipments were extremely light. Among the orders received were a number for sheet iron punches and presses of moderate capacity from manufacturers of metal specialties.

The date for reception of bids on the list of tools required for the Lake High School, Chicago, published some weeks ago in these columns, expired on March 20. The awards for the purchase of this equipment will probably be made in the near future.

Manufacturers of motive power equipment and electrical machinery are not much more favored than those in other lines. There is considerable inquiry for electrical equipment from various municipalities, but they have to do chiefly with small installations.

A few of the larger shops have yet on hand some unfinished contracts taken last year for rolling mill machinery and other large enterprises; these serve to furnish work to a considerable number of men who would otherwise be out of employment. One effect of the present quiet period, to which reference has before been made, is the increased attention that is being paid to the development and perfecting of new machinery. Many new ideas of improvement conceived during recent busy years got no farther than the drawing board, but now that more time is available for such work many of these designs are taking concrete form, and when business again revives the results will be seen in the introduction of many new and improved tools and machinery. Last year was particularly barren of results in this respect; instead of devoting time to new designs and construction manufacturers were bending their energies to keep pace with the demand for their regular product. Indeed, many of them abandoned for a time the manufacture of some of their less profitable lines.

Chicago, Milwaukee & St. Paul Railroad's Machinery Requirements.

The new Pacific Coast extension of the Chicago, Milwaukee & St. Paul Railroad is one of the few large enterprises of this character which has not been seriously retarded by the present financial and industrial depression. Not only is line work being actively pushed without interruption, but arrangements are being made for rolling stock and shop equipment for this division. The following list of machine tools, which has just been issued, is for distribution among the various shops along the line, and forms a very welcome addition to the moderate volume of machine tool business now in the market. It is desired that bids on these tools shall be accompanied by a statement of the net weight, instead of shipping weight, of each tool.

One 36-in. instantaneous change gear lathe, four step cone, double or triple back gears, about 20 ft. bed, compound rest, power cross feed, 2⅛ in. hollow spindle, follow rest, steady rest, taper attachment, friction countershaft; four 34-in. back geared upright drill presses, equipped with automatic stop and self-feed, spindles to be fitted with No. 5 Morse taper shank drills, complete with tight and loose pulleys and belt shifter; five 15-in. back geared bolt lathes, arranged for belt drive and complete with taper attachment, power cross feed, screw cutting attachment, compound rest, countershaft and necessary tools; four 42-in. triple geared lathes to take 10 ft. between centers, arranged for belt drive, complete with taper attachments, hollow spindle, power cross feed, compound rest, countershaft and necessary tools; three 2½-in. double bolt cutters, complete with pump, countershaft, wrenches, chip pans, automatic, with power feed and lead screw attachment applied on both die heads, with two sample lead screws and 24 sets of cap dies as follows: one set ¾ in., 2¼ in., 2½ in.; three sets, 1⅛ in., and two sets each ⅞ in., 1 in., 1¼ in., 1⅜ in., 1½ in., 1⅝ in., 1¾ in., 1⅞ in. and 2 in.; four 36 x 36 in. x 10 ft. planers, with two heads on cross rail, arranged for belt drive and complete with power cross feed, countershaft and necessary tools; five planer vises, with 18-in. jaw for 36 x 36 in. x 10 ft. planer; two four-jawed 24 in. diameter chucks for 36-in. instantaneous change gear lathe; six four-jawed 12-in. diameter chucks for 16-in. back geared both lathes; four four-jawed chucks 30 in. diameter for 42-in. triple geared lathes.

Another departure from Machinery Row is noted in the removal of D. O. James, manufacturer of cut gears and special machinery, who will move from 35 South Canal street about May 1 to 351-353 West Monroe street, where a new two-story brick building 48 x 120 ft. will furnish increased room and light. Among the new tools already purchased for installation in the new building are Gould & Eberhardt and Cincinnati Milling Machine Company's milling machines, and a Gleason beveled geared planer.

Plans are being prepared for the construction of an electric power plant by Merrill H. Fisher, Alamogordo, N. M. This project will include the erection of a power house 36 x 120 ft., with a boiler room 30 x 33 ft., and an engine room 33 x 50 ft. In conjunction therewith plans are also being made for the development of a water power of 1000 hp. capacity at a point 7 miles distant from Alamogordo, current from which will be distributed from the central station. Considerable machinery will be required for carrying out of this enterprise.

The Telephone & Improvement Company, Sweetwater, Tenn., has planned improvements to its plant which will require the purchase of some new electrical machinery and equipment. The company is now in the market for a 60-cycle 100-volt single phase alternating generator. The operating department is in charge of D. L. Smith, superintendent.

The use of traveling cranes is common enough in stove foundries, but the Wehrle Company, Newark, Ohio, is among the first to install such equipment in its storage warehouses for the handling of finished product. For this purpose a three-motor electric traveling Northern crane of about 50-ft. span has been installed. This crane is of special design and was built by the Northern Engineering Works, Detroit, Mich. The latter company recently equipped the foundry of the J. C. Woodcock Feed Mill Company, Litchfield, Ill., with a Newten cupola.

Cincinnati Machinery Market.

CINCINNATI, OHIO, March 24, 1908.

A careful inquiry into local conditions in the machine tool manufacturing district develops some interesting points. For instance, while the general conditions of trade still show a balance on the side of mechanical inactivity, there are occasional flashes of a stimulating and encouraging sort that augur well for the future, and serve most admirably to sustain the faith and hope these men of iron and steel have in their products. One of the largest lathe manufacturers on Friday sold a bill of 10 machines, aggregating over $10,000, eight of which went to one city in the East, the other two to Canada. This was the first order of any size of the week, although inquiries of the past two or three weeks have been uniformly of an encouraging nature.

A recently returned official of another large lathe manufacturing concern made an exhaustive inquiry into manu-

facturing conditions on the Pacific Coast. He found that the machinery manufacturers in the Far West were running about 60 per cent. of capacity. In a general way, however, the visitor found conditions better than in the East or Central West. He believes that conditions are propitious for better times soon, and cites figures showing comparative results at his own establishment here in support of his feeling.

At the plant of a manufacturer of shapers and planers a steady run on full time with but a comparatively small reduction in working force since the first of the year has been almost exclusively on foreign orders. These have now been worked up and for the most part shipped, and the company will very likely reduce working time the coming week to conform to general conditions in this section. Two carloads were shipped to Europe from this plant last month, one already so far this month, and preparations are making at this writing to ship two machines to Paris, France, ordered by cable.

Some nice orders from Europe have been booked recently by the Cincinnati Machine Tool Company, maker of upright drills. Although the practice cannot be said to have been general, a few of the most enterprising builders of tools in this field have employed the few months of depression in perfecting new machines which had been in mind, but which had to remain in the background undeveloped because of the tremendous shop strain of 1907. As a consequence, there are a number of new devices which will be in good shape to go on the market this summer. The perfection of these new types, therefore, and the arrangements for reinforcing and replacing worn out machines in the shops, has given heads of departments plenty to do during the past few weeks.

Five of the largest tool making establishments have signed contracts and will have a splendid Cincinnati exhibit at the convention, June 17 to 24, in Atlantic City, N. J., of the Railway Master Mechanics and Master Car Builders. The machinery will all be in motion and will be shown on Young's Pier. The companies that will exhibit are Cincinnati Milling Machine Company, Cincinnati Machine Tool Company, Cincinnati Planer Company, Bickford Drill & Tool Company and the Lodge & Shipley Machine Tool Company.

Manufacturers in this field are maintaining prices in a very commendable way, and save for an occasional small percentage of discount allowed dealers on closely contested sales in competition with foreign makes, prices are being rigidly adhered to. One local manufacturer during the week received an order for two shapers from the Southern office of a large company which has offices in all large cities. The sale was contingent on a cut (which would represent about $10 on a machine) off the net price, but the cut was not allowed and the company did not buy.

Taking the local field of tool makers into consideration, the situation shows that all plants are engaged, ranging from 4 hr. per day of five days a week to 40 hr. per week, and with forces ranging from a few assemblymen and superintendents to a three-fourths payroll, but a few running on the larger time are economizing by laying off one week in three. This seems a rather favorite practice and until times become normal it is quite likely a number of the larger establishments will follow the plan.

In some other manufacturing lines the times seem almost normal in matter of sales and producing capacity. Companies making machinery for handling sheet iron and sheet metal particularly are running for the most part on full time and with practically full forces.

The J. M. Robinson Mfg. Company, maker of sheet metal machinery, on Spring Grove avenue, has had a splendid run of orders and inquiries the past few weeks. One good sized order of the past week was shipped to Ft. Wayne, Ind., of machinery for shaping corrugated iron. An order just received from a large Parkersburg, W. Va., house specifies a 12-ft. corrugating machine and a 10-ft. roll, and altogether is worth $5000. What might be denominated a run on corrugated rolls of 3 and 4 ft. sizes has developed in the South and Southwest, where the product made of corrugated sheet iron is popular for sewer pipe service.

A general rehabilitation is in process at the old stove foundry of John A. Schulte & Co., at 2619-2623 Colerain avenue. The E. H. Bardes Range & Foundry Company is the style of the company, which has taken possession and will manufacture Bardes stoves and ranges, linings for stoves and ranges and make castings to order. The officers are: E. H. Bardes, president and treasurer; Charles H. Resor, vice-president; William Krummell, second vice-president, and Frank S. Krug, secretary. All the gentlemen have had more or less practical experience in the stove and range business. Mr. Bardes, the president, was for several years the dominant factor in the business of the Kruckemeyer Company, jobber and retailer in ranges and furnaces of this city.

There is considerable local interest in this week's convention in New York City of the National Metal Trades Association. Treasurer William Lodge of the Lodge & Shipley Machine Tool Company, Commissioner Robert Wuest and Secretary N. W. Dingwall started Saturday night to be in time for the meetings of the Administrative Council preceding the opening of the regular sessions on Wednesday.

There is no appreciable improvement in the jobbing foundry line, and owners of plants are making strenuous efforts to keep forces employed a small part of the time. But a very small part of the local field is employed, and the melt is not more than 15 or 20 per cent. of normal. There exists, however, a feeling of hopefulness, and with the encouraging news from the machine tool districts, which tell of increase in inquiries, it is believed, that it will not be long ere castings will be needed.

In the line of steam and engineering specialties the improvement is quite marked, although in the main buying is still of the hand to mouth character.

It is expected that a meeting will be called soon for reorganization of the William Powell Company, brass founder, on account of the death recently of President James Powell. The business was so largely under the personal control and direction of the deceased president that some time will be necessary ere the many threads can be intelligently gathered, although everything about the great establishment was in the very best condition at the time. Theodore Albert is first vice-president and treasurer, Chas. E. McFarlan, second vice-president; George E. Weitkamp, secretary, and Rudolph Muller, superintendent.

The Columbus Structural Steel Company recently closed another successful year, and has reelected the old officers and directors, with the exception that E. N. Freeman was named to replace E. Spencer in the board. The present officers are: O. M. Blose, president; Henry Richter, vice-president; Joseph Shoenthal, treasurer; W. E. W. Cherry, secretary, and E. N. Freeman, general manager.

Reports from Marion, Ohio, indicate that the Fairbanks Steam Shovel Company has inaugurated a 13 hr. per day schedule, and President James G. Fairbanks is quoted as saying that business is improving steadily at that institution. At the plant of the Marion Steam Shovel Company the weekly running time has been increased one day, so that a 40 hr. per week schedule is now being done, and conditions are reported as improving materially at the plant of the Huber Mfg. Company in Marion.

Extensive preparations are under way at the big plant of the Andrews Rolling Mill Company in Newport, for an auspicious opening of the new steel mills, which were illustrated and described in a recent issue of *The Iron Age*. Col. Andrews and his efficient assistants are preparing for the formal opening.

New England Machinery Market.

WORCESTER, MASS., March 24, 1908.

No noteworthy change is apparent in the general business situation in New England. Little, if any, gain in orders is reported in any line of manufacture. The machinery dealers report some business doing, consisting for the most part of second-hand tools and individual new machines. Their business is better than it was two months ago, but it is still far from normal. An unprecedented number of inquiries and requests for prices and estimates are in hand, but up to date they have brought little actual business.

A few of the machine tool builders report an increase in orders. Among them is the Henry & Wright Mfg. Company, Hartford, Conn., which has received sufficient orders to place the works on full running time, though with reduced force. This is in contrast to a period of actual idleness. The new business is sufficient to necessitate manufacturing, in spite of the fact that a considerable stock of the company's high speed drills is already in hand.

The process of adjusting wages to the new conditions is going on rapidly. In the shops this has been accomplished by treating with the men as individuals. In other industries a flat percentage of reduction has gone into force. Little disposition is shown to contest the change.

The New York, New Haven & Hartford Railroad announces that it will erect a large power station at Milford, Conn., similar to that at Cos Cob, for use in connection with its system of electric traction.

The Worcester Steel Foundry Company has leased its plant at Millbury, Mass., to Eugene Edwards, Boston, who will operate it hereafter. William Pestell, who has been manager of the Millbury works for the past three years, retires from the business. Mr. Edwards already operates the steel foundry of the New England Steel Castings Company at Hyde Park, Mass. Both plants manufacture crucible steel castings. They will be operated separately as heretofore, it is understood.

The Terry Steam Turbine Company, Hartford, Conn., has bought a tract of land in the northern part of the city and purposes to build a new plant on the premises. The plans call for a shop building, 80 x 200 ft., designed to be extended to 600 ft. as the demand for new room shall require it. While it is not definitely settled, the building will probably be erected this season. With its completion new machinery will be required, though it is too early to state

what the list will include. Power will be furnished by a Terry steam turbine; the company already has a boiler of sufficient capacity for its initial needs. The business is now located on State street, Hartford. Steam turbines are built in sizes from 10 to 750 hp. The officers of the company are E. C. Terry, president, and James Terry, secretary and treasurer.

The plant of George W. Fifield, Lowell, Mass., manufacturer of engine lathes, was burned March 20, with a loss of about $300,000. The fire originated in the paint shop, and the effects of the conflagration were most sweeping, though it is expected that there will be some salvage in certain parts of the buildings. A large amount of finished work was destroyed. George W. Fifield, owner of the property and the business, had been manufacturing for stock for a considerable time, producing in large lots. Most of the new tools were not assembled. He states that it is too early to decide as to future plans. He may rebuild and continue the business, but this is not settled, nor will it be until the ruins can be gone over to determine what tools have not been damaged beyond satisfactory repair.

It is announced at New Haven, Conn., that the property of the Nettleton & Kelsey Mfg. Company, Fair Haven, has been purchased by Edward Millett and an associate from Waterbury, and that they will continue the business as brass founders. The company succeeded the Oxford Brass Company about a year ago.

The hope is expressed that the Hardware & Woodenware Mfg. Company, manufacturer of toys, will soon be able to resume business by the termination of the receivership. There are a number of plants in New England, including those at Winchendon, Mass.; Keene, N. H.; Brattleboro, Vt., and Pawtucket, R. I. Already a few men have been put to work in one or two of the company's factories. It is said that the company has orders on its books to the amount of $100,000.

Government Purchases.

WASHINGTON, D. C., March 24, 1907.

The Commanding Officer, Frankford Arsenal, will receive bids until April 2 for four Cleveland automatic turret machines.

The following bids were opened March 14, Circular No. 430, for an engine, generator and exciter for the Isthmian Canal Commission:

Class 1. One cross compound, four-valve Corliss noncondensing engine—Bidder 1, Ball Engine Company, Philadelphia, Pa., $10,500; 4, G. & W. Mfg. Company, New York, $16,400 and $11,875; 5, General Electric Company, Schenectady, N. Y., $12,300; 6, Manning, Maxwell & Moore, New York, classes 1 and 2 combined, $20,575.40; 7, McIntyre, Seymour & Co., New York, $15,900; 8, Motley, Green & Co., New York, $12,550, $13,550 and $14,750; 11, Providence Engineering Works, New York, $14,400, $11,300 and $13,900; 13, Western Electric Company, New York, $15,439; 14, Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., $11,025, $14,374, $12,328, $13,792 and $13,470.

Class 2. One 400-kw. generator—Bidder 3, Crocker-Wheeler Company, Ampere, N. J., $6600, $5550, $5100 and $4600; 5, General Electric Company, Schenectady, N. Y., $7000 and $4845; 7, McIntyre, Seymour & Co., New York, $12,700; 8, Motley, Green & Co., New York, $6930, $5827.50, $5355 and $4830; 13, Western Electric Company, New York, $6420 and $5154; 14, Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., $5350 and $6850.

Class 3. One engine driven exciter—Bidder 2, Buffalo Forge Company, Buffalo, N. Y., $1072; 5, General Electric Company, Schenectady, N. Y., $1245; 9, Northern Electric Mfg. Company, Madison, Wis., $925; 12, B. F. Sturtevant Company, Hyde Park, Mass., $970; 13, Western Electric Company, New York, $970; 14, Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., $1233.80.

The following bids were opened March 16, Circular No. 426, for supplies for the Isthmian Canal Commission:

Class 6. Two duplex steam pumps—Bidder 12, Central Metal & Supply Company, Baltimore, Md., $2300; 18, Epping, Carpenter Company, Pittsburgh, Pa., $2000; 20, Fairbanks, Morse & Co., Chicago, Ill., $1400; 24, Fox Bros. & Co., New York, $1625.96; 26, Gardner Governor Company, Quincy, Ill., $1325; 29, A. D. Granger Company, New York, $2548; 41, Knox & Bro., New York, $1612; 51, Manning, Maxwell & Moore, New York, $1430.20; 55, Motley, Green & Co., New York, $1370; 57, National Electrical Supply Company, Washington, D. C., $1666; 68, Platt Iron Works Company, Dayton, Ohio, $1776; 73, H. A. Rogers Company, New York, $2540.50; 89, D'Olier Engineering Company, Philadelphia, Pa., $2600; 92, Henry R. Worthington, New York, $1590.

Class 7. Two vertical tubular boilers—Bidder 14, P. Delany & Co., Newburgh, N. Y., $2050; 24, Fox Bros. & Co., New York, $1778; 25, G. & W. Mfg. Company, New York, $2143; 29, A. D. Granger Company, New York, $1752; 32, Henshaw, Bulkley & Co., San Francisco, Cal., $2150; 40, E. Keeler Company, Williamsport, Pa., $1784; 48, MacKinnon Boiler & Machine Company, Bay City, Mich., $1819; 54, I. P. Morris Company, Philadelphia, Pa., $2350; 55, Motley, Green & Co., New York, $1720; 63, Oil City Boiler Works, New York, $1780; 66, Phoenix Iron Works, Meadville, Pa., $1570, $1670 and $1655; 71, Charles E. Robidoux, St. Louis, Mo., $1700; 83, Vermilye & Power, New York, $1758; 88, Griscom-Spencer Company, New York, $2096; 90, Donegan & Swift, New York, $1922.

The following bids were opened March 12 for a 125-hp. boiler at the office of the Quartermaster, Key West, Fla.:

Babcock & Wilcox Company, Philadelphia, Pa., $3000; Kingsford Foundry & Machine Works, Oswego, N. Y., $2745, New York; $2975, Key West, their specifications; I. P. Morris Company, Philadelphia, Pa., $3550; Ruemelli-Dawley Mfg. Company, St. Louis, Mo., $3550; S. D. Granger Company, New York, $3385; Oil City Boiler Works, Oil City, Pa., $3330; E. Keeler Company, Williamsport, Pa., $3192; Donnegan & Swift, New York, $3467; Lombard Iron Works & Supply Company, Augusta, Ga., $1033; National Boiler & Sheet Iron Works, Indianapolis, Ind., $2700; Springfield Boiler & Mfg. Company, Springfield, Ill., $2957; E. Burhorn, New York, $2980; Pennsylvania Boiler Works, Erie, Pa., $2775; Henry Vogt Machine Company, Louisville, Ky., $2791; Standard Engineering Company, Philadelphia, Pa., $4462.50, New York, $4607.43, Key West; Wm. Curry's Sons' Company, Key West, Fla., $2952.50.

Under bids opened March 3 for machinery for the navy yards Alfred Box & Co., Philadelphia, Pa., have been awarded class 41, one 15-ton electric traveling crane, $4399.

The Grant-Ferris Company, Troy, N. Y., has been awarded contract for one 18-hp. engine for the launch at Tompkinsville, N. Y., at its bid of $725.

The following awards have been made for supplies for the navy yards, bids for which were opened February 25:

Frevert Machinery Company, New York, class 1, one extension gap lathe, $2596; class 78, one radial drill press, $458.

Pacific Tool & Supply Company, San Francisco, Cal., class 2, one toolroom lathe, $1025; class 3, one toolroom shaping machine, $700.

Joseph Clark, Jr., Electric Company, Louisville, Ky., class 5, one sensitive drill, $150.50; class 6, one emery grinder, $150.

Prentiss Tool & Supply Company, New York, class 72, one gap lathe, $675; class 73, one pattern makers' lathe, $303.

Niles-Bement-Pond Company, New York, class 74, one backgeared screw-cutting engine lathe, $436; class 76, one universal milling machine, $665; class 77, one sensitive drill press, $48.

Fairbanks Company, New York, class 75, one planer, $805.

Labor Notes.

The molders' strike at Scranton, Pa., which started in several foundries in that city May 1, 1906, because the union demanded that these plants be run as it might dictate, has been declared off unconditionally by the molders' organization of that city, and the strikers are attempting to secure employment in the shops they left two years ago. These foundries have all been manned with independent molders and coremakers for many months and at the present time it is hardly possible for the proprietors to consider applications from strikers. The Scranton plant of the Allis-Chalmers Company was involved in this strike, with other firms, and the union officials have been particularly vehement in their statements that they would never give up until this company was compelled to concede the demands of the union.

Union molders who recently went on strike from the foundries of the East Buffalo Iron Works, Lackawanna Steel Company and the Buffalo Pitts Company, at Buffalo, N. Y., have been notified by the headquarters of the national union at Cincinnati that strike benefits will be discontinued on and after March 28 on account of lack of funds.

The American Federation of Labor and President Gompers and others of that organization were permanently enjoined from "conspiring, agreeing or combining to restrain, obstruct or destroy" the business of the Buck's Stove & Range Company, in a decision rendered by Chief Justice Clabaugh of the Supreme Court of the District of Columbia, March 23, making permanent the temporary injunction of Justice Gould against the Federation in that case. The Federation's counsel immediately noted an appeal to the District Court of Appeals. This last decision bars the Federation from placing the company on the "unfair list."

The Southern Steel Company, now in receivers' hands, is to be rescued from disintegration by a reorganization fund of $2,500,000 if present plans succeed. Of this amount $500,000 is intended for immediate plant betterment. A Birmingham dispatch says that it is "believed to be very probable that the security holders will raise the desired fund, because under Alabama laws they are bound for all stock subscribed for and not paid for to the full amount."

February was the fifth successive month in which the Pulaski Iron Company's furnace at Pulaski, Va., has produced over 5000 tons of pig iron, the total for the five months being 25,926 tons. With the same size of furnace and using the same grade of ores as heretofore, the mixture containing 41.4 per cent. iron, this is an output of nearly 1000 tons more per month than the average month of previous blasts. Of the above tonnage 98.8 per cent. was standard foundry iron.

HARDWARE

THE annual Hardware conventions this year, as in other years, have afforded evidence of the valuable work which the State associations are accomplishing and the increasing strength, dignity and importance of these organizations. One feature of the movement which may easily be lost sight of is the value of association work in developing the individual merchant. While it is true that men of broad experience and recognized ability are likely to become leaders, many members have benefited quite as much by their association work as the organization with which they are identified. Examples are numerous where the responsibilities of an official position or of important committee work have brought out latent ability in a man which was unsuspected even by his best friends. The atmosphere of the conventions is educating and broadening to the average merchant, who is usually closely confined to his business, and this is especially true of those who participate in the discussions and share the work. Many retail Hardwaremen have grown to be bigger men and better citizens through the reflex of their efforts to serve their association. Unfamiliar and ill at ease they may have been at first, but it has needed only two or three years to effect a change patent to the most casual observer. Naturally those who have worked most zealously for the cause have enjoyed the greatest benefits along the line of individual development.

At its recent meeting the Pennsylvania Retail Hardware Association put itself on record in a most emphatic manner on the question as to the eligibility for membership in the association of merchants who are doing something of a jobbing business. It appears to have been the unanimous opinion of the convention that the fact that a house is broadening out into a wholesale trade is no objection whatever to its membership in a retail Hardware association. The association is to be congratulated on establishing this principle. In view of this action, it certainly cannot be said that the Pennsylvania organization is confined to the smaller merchants, and indeed some of the leading and most progressive houses in the State are connected with it and active and influential in its management. In considering the questions which come before it, it will have the benefit of merchants of wide business relations, marked ability and breadth of view. It may be that the disposition apparent a short time ago in a few of the associations to make it uncomfortable within the organization for the retailers who are developing into jobbers was sporadic and exceptional, the general disposition being to give a liberal interpretation to the term retail Hardware merchant. Unless the association door is wide enough to admit the larger retail houses, and has a spirit sufficiently broad to make them feel at home, the movement would be likely to languish, as merchants of enterprise and ambition with a growing business would be likely to hold aloof. That this danger is being recognized and avoided is a matter for general congratulation. The influence of the example of the Pennsylvania association will doubtless be felt in other State organizations.

Condition of Trade.

Viewed broadly, the Hardware trade continues its steady progress toward the return of normal conditions. In some sections the improvement is so slow as to be hardly appreciable from week to week, a fact which is disappointing to some and gives rise to a feeling of discouragement here and there which is not justified by general conditions. Comparisons with last year's volume of business are, of course, unfavorable, but compared with the totals of two or three years ago the showing of the present season tends to reassurance. Some manufacturers whose capacity has been largely increased during the period of expansion naturally find it necessary to reduce production materially in accordance with the present slackened demand. It is doubtful, however, if general consumption has decreased to the extent which would be indicated by the reduced purchases of merchants, who are generally pursuing the policy of scaling down their stocks to a minimum working basis. This is directly contrary to the plan pursued a year or two ago, and results in manufacturers being forced to carry the stocks which have in more confident times been distributed among their customers. The rigid curtailment of output, however, which has been decided upon by most manufacturing houses, continues effective in preventing serious declines in prices, and the small stocks now carried by the distributing trade necessitate steady purchases of a routine character for immediate requirements and promise a buying movement of some proportions at no very distant date. As already stated, heavy and abrupt declines in prices are being avoided, but it is nevertheless true and to be expected that the market should have an undertone of weakness, which is evidenced, not so much by open reductions, as by quiet concessions to regular customers and on desirable orders tactfully handled. Seasonable goods are now moving in moderate but healthy volume, and, so far as can be judged at this early date, prospects favor an average demand for lines sold in agricultural sections. Complaints regarding collections are heard in some quarters, particularly in the East, but the improvement in the general financial situation should have a beneficial effect on this branch of business.

Chicago.

Assuming that business will continue to develop at its present rate through the remainder of the month, March will show a fair increase in volume over February, but will, withal, be considerably short of the total for March of last year. While the movement is too slow footed to arouse much enthusiasm, the fact that it is forward instead of backward is worthy of emphasis. An estimate of conditions in the Hardware trade should take into account its position as respects other mercantile interests, in comparison with which it shows to good advantage. While in actual results the improvement shown in this or that commodity during the past week has not been of notable importance, there are nevertheless some noticeable signs of coming activity developing in certain directions that should not be overlooked. In the local trade, for instance, the demand for Barrows, Hods, Mortar, Hose and other building contractors' supplies has expanded considerably within the past 10 days, and may reasonably be expected to improve still further as the season advances. Some reorders for spring goods are beginning to make their appearance, and if the consumptive demand is anything like as large as the com-

paratively strong condition of rural communities seems to warrant, the volume of reorders should be relatively important. It is well known that orders placed last fall for spring delivery were based on extremely conservative estimates, and would perhaps hardly suffice to cover a demand reaching even 75 per cent. of normal. Of over 200 dealers in Illinois responding to an inquiry put out to ascertain their views concerning trade prospects for the coming season, 85 per cent. expressed confidence in the development of more than 75 per cent. of normal trade, while the remaining 15 per cent. were doubtful. As a result of an understanding reached by the leading manufacturers of Conductor Pipe, Eaves Trough, &c., prices on these goods have firmed up, and are more regularly maintained. While there is only a moderate amount of building projects actually under way, quite a number of dormant plans are being revived and will shortly be in the hands of contractors. As an instance of this movement one architect this week reports five and another seven small buildings, which had been on the boards for several months, but are just now getting ready for the letting of construction contracts. Makers of Sash Weights are finding a very quiet market, and are not hopeful of much betterment until there is a decided improvement in building. Prices are generally quoted around $24 a ton.

NOTES ON PRICES.

Wire Nails.—As the season advances less conservatism is reported in buying, and mills are receiving new business in fair volume. The necessities this season, either from a large consumptive demand or from fear of lack of Nails and congested conditions of traffic, do not make the placing of large contract orders imperative. Prompt shipments are requested by some buyers, indicating that jobbers are not carrying large stocks. Regular prices are reported as being maintained. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	$2.05
Carload lots to retail merchants	2.10

New York.—Merchants are showing conservatism in making purchases, confining them to actual requirements. Sales of Wire Nails in small lots at store are consequently along moderate lines. Nail houses are represented as maintaining regular prices, but it is reported that jobbing houses sometimes shade prices when Hardware is also sold. Regular quotations are on the basis of $2.40 for small lots at store.

Chicago.—With the Nail and Wire mills of the principal interest running within 15 to 20 per cent. of normal capacity this industry is, in point of activity, well in advance of all others engaged in the manufacture of steel products. New business is being offered in fair volume, and the extreme conservatism that characterizes buying in other directions is not apparent here. Dealers, it is true, are not stocking as heavily as was the case a year ago, but the necessity for anticipating wants far in advance no longer exists. From the demands that are being made upon the mills for prompt shipment of specifications it is inferred the open weather of the past few weeks is stimulating the consumptive demand which, it is believed, will continue to increase as the season advances. Quotations are as follows: $2.23 in car lots to jobbers, and $2.28 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—New business being placed with the mills and specifications against contracts are showing betterment, while shipments of Wire Nails by the mills this month show a decided increase over the same period in February. The present favorable weather, if continued, will be an important factor in stimulating demand, and the mills expect a further increase in business from this time forward. New orders and specifications against contracts are largely confined to nearby requirements, the trade being inclined to be conservative in the matter of carrying stocks. It is stated that regular prices are being maintained. Quotations are unchanged, as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	$2.05
Carload lots to retail merchants	2.10

Cut Nails.—There is no perceptible improvement in market conditions. The average reduction in output of the various Cut Nail mills for the past three months ranges from 30 to 50 per cent., compared with that of the past three years, while sales show about the same proportional falling off. To manufacturers not operating Steel plants there is small profit in the manufacture of Cut Nails at the price asked for Steel. Concessions are being made on regular Steel Nail quotations, which are as follows: $2.05 base, per keg for carload lots at mill. Iron Nails generally should command about 10 cents more than Steel.

New York.—The demand for Cut Nails in the local market is comparatively light. Regular prices are said to be adhered to by Nail houses, but it is reported that Hardware jobbers sometimes shade prices when other goods are sold. Quotations are on the basis of $2.30 per keg for small lots, at store.

Chicago.—The movement in Cut Nails continues extremely quiet. The car shops, which are the most important consumers, have about cleaned up old contracts, and with no new business in sight are ordering practically nothing. Usually there is a good demand for Cut Shingle Nails at this season of the year, but it is holding back. It will, however, develop in a greater or less degree a little later. On the very limited amount of business moving concessions of about 10 cents a keg from regular quotations are being made. Chicago quotations are as follows: Iron Cut Nails, carloads, to jobbers, $2.38; to retailers, $2.43; Steel, to jobbers, in carloads, $2.28; to retailers, $2.33.

Pittsburgh.—Restriction in output among the Cut Nail manufacturers is very general, this being necessary on account of the light demand and also to keep stocks to a minimum. It is stated that present prices of Cut Nails are extremely low in view of the relatively high prices charged the mills for Steel. Prices continue irregular, the official price on Cut Nails being $2.05, but this is being materially shaded. We quote Steel Cut Nails at $1.90 to $1.95, f.o.b. Pittsburgh, for carload lots, and about $2 for small lots, to which freight to point of delivery is added. Iron Cut Nails are about $2.05 at maker's mill.

Barb Wire.—An increasing demand has resulted with continued favorable weather, this showing itself from various sections of the country. The outlook is for a larger volume of business during the coming two months. Prices are being maintained at regular quotations, according to information from the mills. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	$2.20	$2.50
Retailers, carload lots	2.25	2.55
Retailers, less than carload lots	2.35	2.65

Chicago.—Continued favorable weather has had a stimulating effect upon the demand, as is evidenced by the increasing volume of business coming from North and Northwest. The financial resources of consumers of this product have suffered no general impairment, and the prospects of an ultimate volume of business not far from normal seem good. The mills are well supplied with specifications and shipments are going forward at a satisfactory rate. Prices hold firm and unchanged. We quote as follows: Jobbers, Chicago, car lots, Painted, $2.38; Galvanized, $2.68; to retailers, car lots, Painted, $2.43; Galvanized, $2.73; retailers, less than car lots, Painted, $2.55; Galvanized, $2.85; Staples, Bright, in car lots, $2.35; Galvanized, $2.65; car lots, to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—The general demand for Barb Wire from all sections of the country is showing material increase, and the mills are entering more actual new business than for some time past. Mills report that regular prices are being maintained, and the tone of the market is firm. It is not expected that the quantity of Barb Wire pur-

chased in the next month or two will be as heavy as in the same periods last year, but the mills look for a very comfortable run of orders, and confidently anticipate that demand in April and May will show material increase over March. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	$2.20	$2.50
Retailers, carload lots	2.25	2.55
Retailers, less than carload lots	2.35	2.65

Plain Wire.—Manufacturers of Fencing and other lines are not anticipating requirements by placing contract orders far in advance, but demand is improving, as shown by an increased number of moderate sized orders. Requirements for Fence building by farmers are not yet pronounced. Prices are reported as being maintained. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carload lots	$1.90
Retailers, carload lots	1.95

Chicago.—An increasing volume of new business is reported, though the individual size of orders is moderate as compared with those of last year. This is due not only to a natural feeling of conservatism, but also to existing financial conditions which make it desirable for manufacturers of Fence and other products to limit their obligations on account of stock purchases as closely as possible. While not anticipating forward requirements far in advance, hopeful expectations of a fairly satisfactory demand are generally entertained. Prices are reported to be firmly maintained. Quotations are as follows: In car lots, to jobbers, $2.08, f.o.b. Chicago, and to retailers, $2.15.

Pittsburgh.—A material increase in orders at an early date is confidently expected by the mills, as farmers will soon commence to build fences and consumption along other lines will also increase. Fence manufacturers have been placing orders conservatively, and with stocks very light, are expected to come in the market at regular intervals with additional new business. Prices are unchanged, but the tone of the market is firm. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carload lots	$1.90
Retailers, carload lots	1.95

Pocket Cutlery.—A special conference of American manufacturers of Pocket Cutlery was held last week for the purpose of discussing various phases of the present situation as regards that industry. A resolution was passed expressing the sense of the manufacturers that "present costs of production do not warrant and will not permit of any changes in established prices." In a period of reaction in business, this line is certain to feel severely any reduction of stocks or scaling down of purchases by the trade. Cutlery runs into money, and a merchant can cut down the assortment carried, especially in the way of fancy grades, without much injury to his business. The manufacturers, however, are unanimous in the decision to prevent the accumulation of stocks which the market will not readily absorb. During the past couple of years they have found the labor problem a serious one, and the present opportunity to reduce production and get the situation in hand is not entirely unwelcome.

Conductor Pipe, Eaves Trough, Etc.—Following our report of last week referring to the market for Conductor Pipe, Eaves Trough, &c., we give below the schedule of discounts to the trade recommended in a circular letter sent to jobbers under date of March 17. Because of noteworthy changes which have been made we also give the territorial limits in which the discounts are effective. It will be observed that there is considerable variation in the prices recommended for different territories, a fact which may be explained by peculiar conditions in the way of competition. It should also be noted that no prices are named on Copper lines, which are reported as low and irregular in all sections. Terms of payment are the same as formerly—that is, 2 per cent. discount for cash 10 days from date of invoice. There is no freight allowance on shipments of less than 250 lineal feet. On shipments of this amount or more the allowance varies according to the territorial limits, which are as follows:

UNDEFINED TERRITORY:
Undefined territory consists of the States lying west of the territory actually defined, and all points in undefined territory will take the prices for Northwestern territory, with freight allowed not exceeding the tariff rate of freight to whichever one of the following points through or nearest which the shipment must pass to reach destination: Joplin, Mo., Nevada, Mo., Kansas City, Mo., St. Joseph, Mo., Omaha, Neb., Sioux City, Iowa, St. Paul, Minn., Duluth, Minn.

EASTERN TERRITORY:
Eastern territory consists of the New England States, New Jersey, Delaware, the District of Columbia, Virginia, North Carolina, South Carolina, and that portion of the State of New York including the counties of Wayne, Ontario, Steuben, and all that part of the State lying east of said counties; that portion of the State of Pennsylvania including the counties of Tioga, Lycoming, Clinton, Center, Huntingdon, Fulton, and all that portion of the State lying east of the same; the State of Maryland, excepting the counties of Allegany and Garrett, and the city of Savannah, Ga.

PITTSBURGH TERRITORY:
Pittsburgh territory consists of Ohio and West Virginia, the counties of Allegany and Garrett in the State of Maryland; that portion of the State of Pennsylvania including the counties of Monroe, Livingston, and Allegany, and all that portion of the State lying west of the same; that portion of the State of Pennsylvania including the counties of Potter, Cameron, Clearfield, Blair and Bedford, and all that portion of the State lying west of the same.

CENTRAL TERRITORY:
Central territory consists of Kentucky, Indiana, Illinois, Wisconsin, and the southern peninsula of Michigan.

NORTHWESTERN TERRITORY:
Northwestern territory consists of Iowa, Missouri, the northern peninsula of the State of Michigan and that part of the State of Minnesota lying south and east of the Minneapolis, St. Paul, and Omaha Railroad from a point on the Iowa State line near Worthington to Minneapolis and St. Paul, and south and east of the St. Paul and Duluth Railroad from Minneapolis to Duluth, also the city of Sioux Falls, S. D.

TENNESSEE TERRITORY:
Tennessee territory consists of Tennessee only.

SOUTHERN TERRITORY:
Southern territory consists of Mississippi, Alabama, Georgia, excepting the city of Savannah, Florida and the cities of New Orleans, La., Galveston, Texas, and Houston, Texas.

WESTERN TERRITORY:
Western territory consists of Kansas and Nebraska.

SOUTHWESTERN TERRITORY:
Southwestern territory consists of Oklahoma, Louisiana, Arkansas and Texas, except the cities of New Orleans, La., Galveston, Texas, and Houston, Texas.

Following are the discounts ruling at point of destination in the various districts:

CONDUCTOR PIPE AND EAVES TROUGH.

Article.	Eastern. Per cent.	Pittsburgh. Per cent.	Central. Per cent.	Northwestern. Per cent.	Western. Per cent.	Tennessee. Per cent.	Southern. Per cent.	Southwestern. Per cent.
Conductor Pipe:								
Galv. Steel, standard sizes and gauges	70-10	75-10-5	75-10	75-7½	70-12½	70-10	70	70
Galv. steel, irregular sizes and gauges	70-10-5	75	75	75	70-10	75	70-10	70
Galv. C. C. Iron, standard sizes and gauges	50-10-7½	60	60	60	50-12½	50-12½	50-12½	50-5
Galv. C. C. Iron, irregular sizes and gauges	70-5	70-5	70-5	70-5	70	70-5	70	65-10
Eaves Trough:								
Galv. Steel, standard sizes and gauges	75-10-5	80-20	80-10-10-2½	80-10-10	80-10	80-5	80	75-10-2½
Galv. Steel, irregular sizes and gauges	75	75	75	75	70-10	75	70-10	70
Galv. C. C. Iron, standard sizes and gauges	60-20	65-10	65-10	65-10	60-10-5	60-10-5	60-10-5	60-5
Galv. C. C. Iron, irregular sizes and gauges	70-5	70-5	70-5	70-5	70	70-5	70	65-10
Plain Ridge Roll and V. Ridge Cap:								
Galvanized Steel, crated	80	80-20	80-10-10-2½	80-10-10	80-10	80-5	80	75-10-2½
Galvanized Steel, wired in bundles		80-20-5	80-10-10-5	80-10-10-2½	80-10-2½	80-5-5	..	75-10-7½
Galvanized C. C. Iron, crated	70	65-10	65-10	65-10	60-10-5	60-10-5	60-10-5	60-5
Formed Valley:								
Galvanized Steel	60-20-5	70-10-10	70-20	75	60-20-10-5	70-2½	60-20-5	60-10-7½
Galvanized C. C. Iron	40-20	50-5	50-5	50-5	40-10	40-10	40-10	40-2½

Axes.—There has been no change in the situation on Axes since our last report. The market continues to develop irregularity, which seems to have had the effect of causing many jobbers to postpone placing their orders. While low prices are being reported, it sometimes devel-

ops that these are quoted on goods not in every way up to the standard of a first quality Axe. Thus attempts to represent in figures the level of the market at the present time are largely futile.

Brass Goods.—Base prices on Brass material were advanced ½ cent per pound each on Sheets, Wire, Rods and Brazed Tubing March 23. The base prices for moderate purchases are: Sheets, 14¾ cents; Wire, 16¼ cents; Rods, 15 cents and Brazed Brass Tubing 21¼ cents per pound. The market for both Copper and Brass material continues featureless, with very little being done.

Bolts and Nuts.—The monthly conference of manufacturers of Bolts, Nuts, Rivets, &c., held last week, resulted in a reaffirmation of published prices. Where orders of any importance are to be placed, however, special concessions may be obtained.

Vises.—Some manufacturers of Solid Box Vises have revised their prices, announcing a reduction amounting to about 10 per cent. on base sizes. The market for these goods may now be represented in a general way by discounts of from 50 and 10 to 50, 10 and 5 per cent.

Coal Hods.—A concession of 7½ per cent. beyond prices previously ruling is noted in the quotations of leading manufacturers of Coal Hods. It is reported that this concession is offered only to the jobbing trade on orders for delivery east of the Mississippi River.

Pumps.—While there has been no marked irregularity in quotations on competitive styles of Pumps, such as Sink and Cistern, Pitcher Spout, &c., and while no general reduction has been made by leading manufacturers, prices may fairly be reported as somewhat lower. Concessions noted amount to about 5 per cent. beyond the figures recently ruling.

Oilers.—A movement counter to the general tendency of the Hardware market is observed in several classes of Oilers, manufacturers of which are announcing advances of considerable importance. The new level of the market may be represented in a general way by quotations on Copperized Steel, Spring Bottom Oilers of 70 to 70 and 10 per cent. discount; on Railroad Oilers, 60 to 60 and 10 per cent., and on Brass Oilers, 50 to 50 and 10 per cent.

Binder Twine.—With the arrival of spring, according to the calendar, the volume of business indicates an increasing interest by purchasers of Twine, although possibly smaller than at the corresponding period last year. The recent price of Sisal Fiber, in comparison with that of Manila Fiber, has had a tendency to impart a firmer tone to the Twine market. With the exception of quotations on the so-called plain tag Twine, which it is reported some concerns are offering at ¼ to ½ cent below regular prices, Western quotations appear to be well maintained, as follows:

	Cents per pound.
Sisal	8¼
Standard	8¼
Standard Manila (550 ft.)	9¾
Manila (600 ft.)	11¼
Pure Manila	13

Carload lots, ¼ cent less; 5-ton lots, ⅛ cent less; central delivery, fall terms.

Rope.—The market continues quiet, and while manufacturers are receiving orders continually they are usually for small lots. Even jobbers are confining their purchases to immediate requirements and are carrying no surplus stock. Sisal Hemp is now quoted at 5½ cents per pound and fair current Manila Hemp at 6 cents per pound, but Manila is weak at this figure. Shipments of Manila Hemp are being received liberally at this port, with light demand from manufacturers, owing to the fect that they still have supplies on hand. The light demand for Rope has not given them an opportunity to work all their Hemp up into Rope. The following quotations for base sizes fairly represent the market: Pure Manila, 10½ to 11 cents; B quality grades down to 8 to 9 cents; Pure Sisal, 7½ to 8 cents; lower grades Sisal, 6½ to 7 cents; No. 1 Jute, ¼-in. and up, 6¼ cents; No. 2 Jute, ¼-in. and up, 5¾ cents.

Window Glass.—Manufacturers are turning out about the same quantity of Glass that they were a week ago, although some factories have difficulty in keeping the different departments satisfactorily manned. Prices do not show much firmness, and continue favorable to the jobber. Demand from factory is light as the result of general business conditions. Locally business is light and prices more or less irregular. The minimum prices recommended by the Eastern Window Glass Jobbers' Association are as follows: Single strength, 90 and 25 per cent.; double strength, 90 and 30 per cent. discount from jobbers' list. These prices are, however, not closely adhered to.

Linseed Oil.—The demand for small lots of Oil is fairly good, although no great amount of activity is shown in this market. Crushers are operating in a moderate way and are carrying comparatively small stocks of Oil and Seed. The market continues very even, and shows no indication of a desire for business by sacrificing prices. Local quotations are as follows: In five-barrel lots, State and Western Raw, 40 to 42 cents; City Raw, 43 to 44 cents per gallon. Boiled Oil is 1 cent per gallon advance on Raw.

Spirits Turpentine.—An unusually rapid and unlooked for advance has taken place in Turpentine during the week, as the result of operations in the Savannah market. The exact cause of the flurry has not yet been definitely reported. With the new crop expected in considerable volume in the near future and with general business conditions as they are, it is not anticipated that manufacturers will purchase heavily. The New York market is represented by the following quotations: Oil Barrels 57½ to 58 cents; Machine Made Barrels, 58 to 59 cents.

THE NATIONAL RETAIL HARDWARE CONVENTION AT ST. LOUIS.

(By Telegraph.)

THE ninth annual convention of the National Retail Hardware Association began its sessions in the Planters' Hotel, St. Louis, on Tuesday forenoon, 24th instant, with a large attendance of delegates and guests. The room in which the meetings are held is admirably adapted to its purpose, being of suitable size and conveniently located.

When President Miles called the meeting to order he referred to the pleasant circumstances under which the association meets, touching briefly on the history of the organization and its position of strength and usefulness. The singing of "America" was very heartily united in by the assembled company, after which the invocation was offered by Rev. A. H. Jordan. At this point the regular programme was interrupted by the presentation to President Miles of a handsome gavel, the gift of the members of the association in recognition of his services as presiding officer. The presentation was made by F. Alex. Chandler, Boston, in a very happy and interesting address.

The welcome on behalf of the city was expressed by Edward Devoy, president of the Merchants' Exchange, who in his address referred to the position occupied by St. Louis in manufacture and commerce and also to the advantages which result from trade associations as the members are brought together and given an opportunity to learn from one another.

The welcome on behalf of the St. Louis Hardware interests was made by O. H. Witte, president of the Witte Hardware Company, in introducing whom Mr. Miles referred briefly to the history of the company and its prominent place among Hardware jobbing houses. Mr. Witte, after referring to the pleasure afforded him by the opportunity to extend the city's welcome to the National Association, alluded happily to the fact that the jobbers of St. Louis have sometimes been accused by the manufacturers of not acting in full harmony with one another, and made the point that these manifestations of the spirit of competition resulted in benefit to the retail merchant. These little skirmishes, as they were termed,

were referred to as having made St. Louis the leading Hardware market of the world.

W. P. Bogardus, ex-president of the National Association, was called upon to respond to these addresses of welcome. On his introduction he was greeted with long continued applause, which indicated the affection and honor in which he is held. Mr. Bogardus, after some pleasant references to the immediate circumstances, called the attention of the convention to the position the country occupies in industry and commerce, and also to the opportunities that are afforded by the annual gatherings of the Hardware merchants for conference, which should be exceedingly useful in giving a broad view of their business relations and in formulating and carrying out a policy for the great betterment of the trade.

An admirable and carefully prepared paper was then presented by R. W. Shapleigh, vice-president of the Norvell-Shapleigh Hardware Company, in which he discussed the question, "Are Goods Well Bought Half Sold?" This address was an interesting discussion of the question and abounded with valuable suggestions.

Brief and informal addresses extending hospitality were made by W. C. Simmons, president of the Simmons Hardware Company, and by S. Norvell, president of the Norvell-Shapleigh Hardware Company. Brief remarks were also made by C. W. Asbury, president of the American Hardware Manufacturers' Association, and representatives of the trade press.

H. J. Gordon, on behalf of the Committee of Entertainment, made a felicitous address, introducing announcements of the entertainment provided for the delegates and their friends. The features of entertainment included a theater party on Tuesday evening, matinee for the ladies on Wednesday, reception in the parlors of the Planters' Hotel on Wednesday evening, a banquet on Thursday evening, and a carriage drive for the ladies on Friday afternoon.

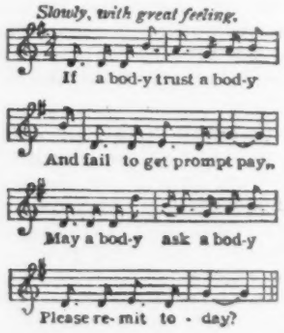
The exercises were interesting from first to last and kept the close attention of the large company assembled, in which were many ladies.

The session on Tuesday afternoon was called to order promptly at 2 o'clock by the president, there being in attendance about 80 delegates. The programme covered some routine business of the association, including the president's address, secretary's report, treasurer's report and reports of various committees.

The association enters on its work under very favorable auspices, and the convention promises to be exceptionally successful.

A Tuneful Reminder.

THE accompanying bars of music, printed on business stationery, illustrate a tactful method which some merchants have employed during the period of slow collections to remind customers of their overdue accounts.



The tune to which the words are set is the familiar one of "Comin' Through the Rye," and if sung slowly and with great feeling, according to directions, the effect is certainly plaintive enough to touch the heart of the most incorrigible slow pay.

LETTERS are being sent out by C. E. Kersey, Richmond, Va., secretary-treasurer of the Southern Hardware Jobbers' Association, announcing transportation routes, hotel rates, &c., for the annual convention of the association, to be held jointly with the semiannual meeting of the American Hardware Manufacturers' Association, at Hot Springs, Ark., June 9-12, with headquarters at the Arlington Hotel. In connection with this announcement an attractive booklet descriptive of Hot Springs is also being mailed.

AN INGENIOUS TINWARE LOCOMOTIVE.

THE enterprising Hardware firm of John S. Menagh & Co., Jersey City, N. J., recently set up in one of its prominent show windows the businesslike looking locomotive shown in the accompanying illustration. It furnished a striking method of displaying kitchen goods and attracted much attention from passersby. A heavy 10-gal. Milk Can formed the main body and boiler of the engine. Deep round Pans served as wheels and a square Pan as the roof to the engineer's cab. A realistic smokestack is formed by a Funnel set in a Quart Measure, from which belches a cloud of smoke represented by Steel Wool.

Locomotive in the Window of John S. Menagh & Co.

A fine Wire sticking in the smokestack and bent back over the engine serves to hold the smoke in a natural position. Other goods used in the get-up will readily be recognized in the illustration.

THE formal opening of the new store of F. A. Hull & Son, Danbury, Conn., took place on the 4th inst. There was music by an orchestra, refreshments were served, and the occasion was most successful and enjoyable. In the evening a banquet was tendered by the firm to its employees and visitors from out of town. The former Hull Block was destroyed by fire on March 4 of last year, just one year previous to the opening of the new store. On the site of the burned structure a strictly modern fireproof business block of solid concrete reinforced with steel has been constructed. It is said to be the most costly as well as substantial building in Danbury. The main building measures 71 x 150 ft., three stories, with a four-story L, 46 x 64 ft. The block provides three stores on Main street, the principal frontage. The middle store, 25 x 150 ft., the full second floor, 71 x 150 ft., and the entire four-story L will be occupied by the Messrs. Hull. The firm has lately issued a booklet giving on the front cover a sketch of the new store and presenting a short history of this old and well-known Hardware firm. The business was founded in 1843 by Charles Hull, F. A. Hull's father. Illustrations are given of Mr. Hull's tin shop and stove store, the construction of which was largely done by Mr. Hull himself; Charles Hull's "block" as it appeared in 1850; Hull & Rogers' establishment, 1865 to 1890, and the Hull block which was erected in 1890 and burned out last year. Portraits are given of Mr. Hull and also of Frederick A. Hull, his son, and Charles Hull, his grandson, the two latter comprising the firm at the present time.

THE LOCKWOOD COMPANY, representative in New York of the Lockwood Mfg. Company, South Norwalk, Conn., manufacturer of Locks, Latches and a full line of Builders' Hardware, will on or about May 1 remove from the present address, 79 Reade street, to 16-18 Reade street, near Centre street.

Correspondence.

The True Valuation of Export Business to the American Manufacturer.

To the Editor: The active, wide awake manufacturer appreciates the valuation of not only making his product known but wanted, by means of the numerous advertising channels, and accordingly he permits no stone to be left unturned to accomplish the desired end. The result of such a policy soon becomes productive of an established name in all parts of the globe which in turn signifies inquiries, orders and an increased business.

On the other hand, the inactive ones are unknown outside of the limited established trade to whom they have been catering for years. Their business has a fixed high point, beyond which it never traverses.

Many of the latter maintain that the foreign business does not justify the trouble necessary for its culmination; a point worthy of careful consideration. We all appreciate the large volume of increased labor necessary for the proper execution of such orders; the packing, marking, shipping and the careful compilation of numerous documents, &c., but if these essential minor details be carried out in the manner required, the increase in the volume of business at an advanced American market figure would soon assert the justification of a close adherence to this particular trade.

The valuation of this export business was never so pronounced as during the recent financial and industrial depression when the American factories were forced, more or less, to depend upon their foreign orders to tide them over until such a time as the home buying should resume its normal condition.

Many of the manufacturers have heretofore paid but little attention to this branch of business, not realizing the wonderful opportunities that are in store in this particular trade. The more progressive, however, have cultivated it to the best of their ability by not only adapting their business policy to the conditions of the many foreign markets, but their goods as well, altering them where necessary to better meet the particular circumstances peculiar to the country in which they are to be used. As a result their foreign orders have remained strong when most needed, and have, in many cases, permitted the factories to remain open, which otherwise would have been forced to close down, throwing thousands out of work.

The export trade, therefore, serves as the flywheel to the American manufacturer, maintaining the same momentum in times of panic as in the more prosperous periods. It penetrates to every corner of the world, augmenting a call for the product, which materially enhances its valuation.

Further, where properly managed, this unlimited business can be transacted upon a cash basis, a fact which certainly gives preference over our own domestic trade.

On the other hand, American goods are in demand not because we have the monopoly on the machine trade, but because of the quality and ingenuity of the machine tool products. The American made tools have, as a rule, a decided characteristic peculiar to themselves, the result being an increased output at a reduced cost but at a material sacrifice to the life of the tool. In other words, the best foreign tools appear to have a somewhat longer life than the American makes.

The tendency of general demand leans in favor of the American tool and consequently a gigantic volume of business awaits the American manufacturers who have articles of real worth and who do not hesitate to make the fact known.

With the true American ability and perseverance properly handled, industrial depression should be a thing of the past.

G. P. BLAKISTON,
President Pittsburgh Automatic Vise & Tool Company.

PITTSBURGH, March 11, 1908.

THE EDGAR DICK HARDWARE COMPANY has lately moved into new and finely appointed storerooms at 311 Wabash avenue, Terre Haute, Ind.

Price-Lists, Circulars, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our Catalogue Department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

CLEVELAND GALVANIZING WORKS COMPANY, Cleveland, Ohio: Illustrated bulletin E-7, referring to Standard Butter Cutters and Butter Boxes and Elgin Butter Cutters.

CARBORUNDUM COMPANY, Niagara Falls, N. Y.: Large two-color circular, referring to Sharpening Stones, &c., and illustrating the company's current publicity advertising.

STELWAGON MFG. COMPANY, Philadelphia, Pa.: Circular referring to Kure-a-Leke Mastic Compound, for roofing gutters, &c.

PHENIX MFG. COMPANY, Milwaukee, Wis.: Illustrated price-list circulars referring to Swinging Half Screens, Hangers and Fasteners, Full Size Window and Door Screens and Hardware Specialties.

J. S. WOODHOUSE, 189-191 Water street, New York: Illustrated catalogue R, referring to a large line of Agricultural Implements and Machines for farm, field and garden.

PIKE MFG. COMPANY, Pike, N. H.: Booklet entitled "Money Makers," illustrating and describing new assortments of Oil and Scythe Stones and Razor Hones.

BERNARD GLOEKLER COMPANY, Pittsburgh, Pa.: Illustrated "Smoke-Talk" circular referring to Kitchen Equipments, Refrigerators, &c., of which the company makes a specialty.

EGYPTIAN LACQUER MFG. COMPANY, 152 Front street, New York: Booklet describing Egyptian Black Lacquers and the purposes for which they are used.

UNITED STATES CARTRIDGE COMPANY, Lowell, Mass.: Catalogue and price-list for 1908 of Metallic Cartridges, Paper Shot Shells, Brass Shot Shells, Primes, Belcher's Shot Shell Loaders, &c.

ILLINOIS HEATER & MFG. COMPANY, Chicago: Illustrated booklet referring to Self Watering Flower Boxes and Baskets, Fireless Cookers, Window Refrigerators, &c.

NOVELTY CUTLERY COMPANY, Canton, Ohio: Illustrated catalogue and price-list of Shears and Scissors, Pocket Knives, Paper Knives, &c., which are especially offered for premium purposes.

J. EDWARD OGDEN COMPANY, 147-149 Cedar street, New York: Large cloth bound catalogue and price-list, containing more than 400 pages, illustrating and listing an extensive line of Heavy Hardware and Supplies for mines, mills, machinists, railroads, contractors, electrical constructors, dock builders, shipyards, &c.

BERGMAN HARDWARE & TOOL MFG. COMPANY, Buffalo, N. Y.: Illustrated circulars referring to B. B. Combination Pliers, Forged Tool Steel Tinners' Snips and Corner Bit Braces.

REVERE RUBBER COMPANY, Boston, Mass.: Illustrated catalogue covering an extensive line of Rubber Goods for mechanical use, including Belting, Hose, Packing, Blankets, Rubber Covered Rolls, Valves, Springs, &c.

STANDARD VARNISH WORKS, 29 Broadway, New York: Budget of booklets, circulars, &c., referring to House Finishes, Carriage and Auto Car Varnishes, Railway Varnishes, Marine Spar Varnish, Klearstone Stains and Insulating Specialties.

NEW YORK RUBBER COMPANY, 84-86 Reade street, New York: Illustrated price-list of Rubber Belting, Hose, Packing, &c.

NORVELL-SHAPLEIGH HARDWARE COMPANY, St. Louis, Mo.: 1908 spring catalogue, 290 pages, illustrating and describing a complete jobbing line of seasonable goods, including Fishing Tackle, Baseball Goods, Tennis Goods, Hammocks, Boating Supplies, Cutlery, Tents, Firearms, Bicycles, Garden Tools, Hose Goods, Screen Goods, Refrigerators, Freezers, &c. The catalogue is accompanied by a discount sheet.

Death of George M. Clark.

GEORGE M. CLARK, president of the Cutaway Harrow Company, Higganum, Conn., died suddenly at the factory on Monday afternoon, 2d inst. George Marshall Clark was born in Haddam, Conn., June 11, 1833, a son of George Washington and Cynthia Selden Clark. Mr. Clark received but a limited school training, and as he was but 12 years of age when his father died, he was early obliged to go to work to aid in the support of the family, which devolved upon him and an elder brother, who was but 15. For about two years following the death of his father he was employed on neighboring farms. He then worked at wool carding and subsequently for 17 months at blacksmithing and the making of edge tools. Thinking it improbable that he would ever be able to return to school, he obtained the best known works upon mechanical work and spent from three to five hours each evening in their study. Mr. Clark's first opening came when he was 17 years of age. He had made a trip to Savannah, Ga., where he worked as a common hand in a sawmill. The main shaft of the mill broke and it was thought there was no one at hand capable of making the repairs. Mr. Clark's knowledge of blacksmithing came to his aid, and he welded the shaft and thus brought himself into notice. He was very soon afterward given the contract for the erection of three large steam sawmills in Georgia, which were completed and in operation within five months. All this was done before Mr. Clark was 18 years old. Mr. Clark then formed a partnership with his elder brother, who was a stonemason, and they continued together as Clark Brothers for over 30 years.

For about 10 years Mr. Clark carried on shipbuilding in summer and house carpentering in winter, working from Bangor to New Orleans. In the fall of 1859 Mr. Clark engaged with a Meriden cutlery firm as a journeyman carpenter at $1.75 a day, but within a very short time his ability was discovered and he was made foreman of all outside men at a salary of $10 per day, remaining in this position for seven years. Meanwhile Mr. Clark had turned his attention to the improvement of agricultural implements, and in the fall of 1867 he and his brother commenced the erection of a factory in Higganum. They began the manufacture of mowing machines, for which Mr. Clark had invented a new mechanical movement, but finding that they were infringing on other patents, they abandoned this line to commence the manufacture of other agricultural implements. At the beginning of their operations a stock company was formed, of which George M. Clark was president, and his brother, Thomas J. Clark, vice-president. Mr. Clark invented and patented a number of improvements on agricultural implements, all of which were utilized by the company. In 1871 Mr. Clark invented a wire rope plant, which he soon afterward patented, which is said to have been the first that effectually prevented the slipping of the rope.

In later years Mr. Clark devoted much time to the cultivation of grass, and was considered an authority on its culture. He had delivered lectures on the subject all over the eastern part of the United States. Mr. Clark was of a benevolent disposition and performed many acts of charity during his life. He was an attendant at the Congregational Church at Higganum, which he helped to raise when a mere boy, and had been a regular supporter of the church ever since.

THE house of Stratton Bros., Greenfield, Mass., which has recently been succeeded by the Stratton Level Company, was established in 1869 by C. M. & E. A. Stratton, who continued in the business for 30 years. Since their retirement the concern has been managed by R. O. Stetson, whose continuous connection with it covers a period of 15 years, and who retains an interest in the new company as treasurer. O. L. Richtmyre, for some years connected with the claim department of the Boston & Maine Railroad, enters the company as president, and will have charge of the business management and sales department. Mr. Stetson will be in full charge of the manufacturing department, and a new and modern factory of increased production is shortly to be built.

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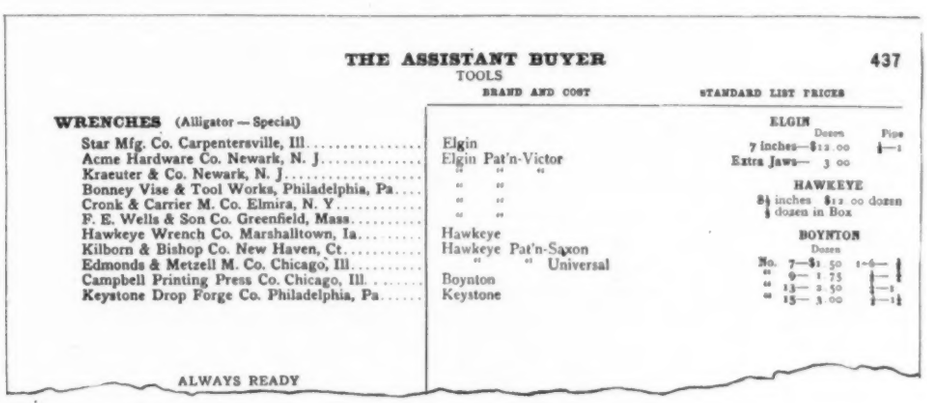
The Assistant Buyer.

THE SULLIVAN SYSTEM, 280 Broadway, New York, is the publisher of the "Assistant Buyer," a reference book devised especially for the Hardware and Supply trades, among whom its distribution is limited. It consists of some 1500 pages, approximately 9 x 11 in. in size, contained in a neat loose leaf binder, which has the attractive features of rapid action, combined with simple and durable construction. The book is to be issued in annual editions, the first having been recently completed and placed in the hands of subscribers, who, we are advised, include close to 75 per cent. of the members of the National Hardware Association, the Southern Hardware Jobbers' Association, the National Supply & Machinery Dealers' Association and the Southern Supply & Machinery Dealers' Association.

The work, which is printed in concise form, comprises five general divisions: 1. Heavy Hardware, Iron and Steel, Blacksmiths' Supplies, &c.; 2, Mechanics' Tools; 3, Machinery; 4, Supplies, including Steam, Water and Gas, Mill, Mine, Railroad, Machine Shop and Contractors' Supplies; 5, Shelf Hardware, Paints, Sporting Goods, Housefurnishing Goods, &c. Each division is arranged as if it formed a separate book, with subjects classified in alphabetical order. All five divisions are covered by one exhaustive general index in the front of the book.

The arrangement of the information given under each classification is indicated by the accompanying reproduction of a section referring to Wrenches and may be described as follows: Beginning at the left, the first column gives names and addresses of manufacturers; in the second column such brands or trademarks as a manufacturer may use are given after his name, and a space is provided for the buyer to note after the name or brand the discount or net price quoted, thus affording a convenient record of comparative costs. In the last column standard list prices are given where they apply, so that a buyer has all points pertaining to any line grouped together on a single page. The principal value of the work, however, consists in the record of manufacturers' names, addresses and brands properly indexed and classified. The other features, such as comparative price-lists, capacity of mills, independent manufacturers, or members of combinations, manufacturers' agents, &c., are merely incidental.

A feature which recommends the book is the fact that its compilation is based on practical experience, its author, Alfred T. Sullivan, having been associated for 14 years with the Oliver Bros. Purchasing Company, New York, buyer for a number of wholesale Hardware and Supply houses in the United States and foreign countries. The work is dedicated to Thomas E. Oliver of this house. In addition to his own records the author had access to the records of five other buyers among his friends in New York City, and also received valuable contributions of information from buyers in other parts of the country. Having traveled considerably during the past few years, Mr. Sullivan has also secured many important points from manufacturers direct. Judging from the expressions of many experienced buyers, the book has commended itself to the trade and will prove of much practical value to those interested in the lines which it covers. The subscription cost of $10 per year covers the book complete with loose leaf binder and all revised pages which may be issued during the year. Subscriptions to this book are contingent upon their being entered for a period of not less than three years. New editions containing revisions and improvements will be issued the first of each succeeding year.



THE ASSISTANT BUYER 437

TOOLS

	BRAND AND COST	STANDARD LIST PRICES
WRENCHES (Alligator — Special)		ELGIN
Star Mfg. Co. Carpentersville, Ill.	Elgin	Dozen: 7 inches—$12.00; Pipe: ½—1
Acme Hardware Co. Newark, N. J.	Elgin Pat'n-Victor	Extra Jaws— 3 00
Kraeuter & Co. Newark, N. J.	" " "	
Bonney Vise & Tool Works, Philadelphia, Pa.	" "	HAWKEYE
Cronk & Carrier M. Co. Elmira, N. Y.	" "	8½ inches $12.00 dozen; ½ dozen in Box
F. E. Wells & Son Co. Greenfield, Mass.	" "	
Hawkeye Wrench Co. Marshalltown, Ia.	Hawkeye	BOYNTON
Kilborn & Bishop Co. New Haven, Ct.	Hawkeye Pat'n-Saxon	Dozen
Edmonds & Metzell M. Co. Chicago, Ill.	" " Universal	No. 7—$1.50; 1-6—¼
Campbell Printing Press Co. Chicago, Ill.	Boynton	" 9— 1.75; ¼—½
Keystone Drop Forge Co. Philadelphia, Pa.	Keystone	" 13— 2.50; ½—1
		" 15— 3.00; 1—1½

ALWAYS READY

Portion of Page from The Assistant Buyer.

Requests for Catalogues, Etc.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM WEATHERFORD HARDWARE COMPANY, Weatherford, Texas, which has been incorporated with a capital of $15,000 by W. W. Major and others. The capital stock is fully paid up. The company handle Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Sporting Goods, Vehicles, &c.

FROM LARSON HARDWARE COMPANY, Sioux Falls, S. Dak., which has disposed of its retail department to Olaf Hanson, and will hereafter confine itself to the wholesale business in Shelf and Heavy Hardware, Stoves, Tinware, White Lead, Linseed Oil, Glass, Blacksmiths' Supplies, Mechanics' Tools and Hardwood Lumber.

FROM WELLMAN MCROBERTS COMPANY, which has opened a new Hardware store in Orfino, Idaho.

FROM OLAF HANSON, formerly of Mt. Horeb, Wis., who has purchased the retail business of the Larson Hardware Company, Sioux Falls, S. Dak.

FROM HALBERT & WEBBER HARDWARE COMPANY, Wenatchee, Wash., in which A. V. Shepard has recently bought an interest. The company handles Shelf and Heavy Hardware, Stoves, Tinware, Paints, Oils and Sporting Goods.

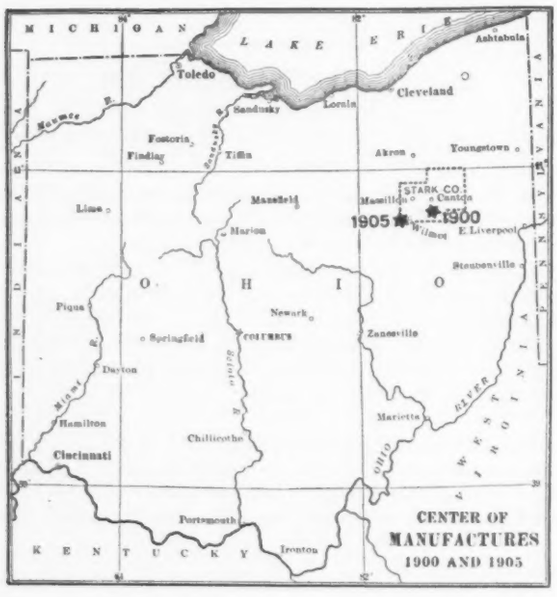
FROM W. S. WOOLSEY, who has opened a general Hardware, Tinware, Implement and Harness store at Dalton, Neb.

FROM DAVID D. SLAIGHT HARDWARE COMPANY, Newark, N. J., which has been incorporated with a capital of $100,000 by D. T. Slaight, E. B. Irvin and S. H. Williams.

The firm of Wachter, Arnolt & Co., Pender, Neb., Hardware merchants, has been dissolved and will hereafter be known as the Wachter Hardware Company, George A. Wachter and John Forest having purchased the interest of Mr. Arnolt.

CENTERS OF MANUFACTURES AND POPULATION IN THE UNITED STATES.

THE accompanying maps, prepared from advices for which we are indebted to S. N. D. North, Director of the Census, Washington, give a clear idea in regard to the centers of manufactures and population in the



Center of Manufactures in the United States in 1900 *and* 1905, *Based on Cities of Over* 8000 *Population.*

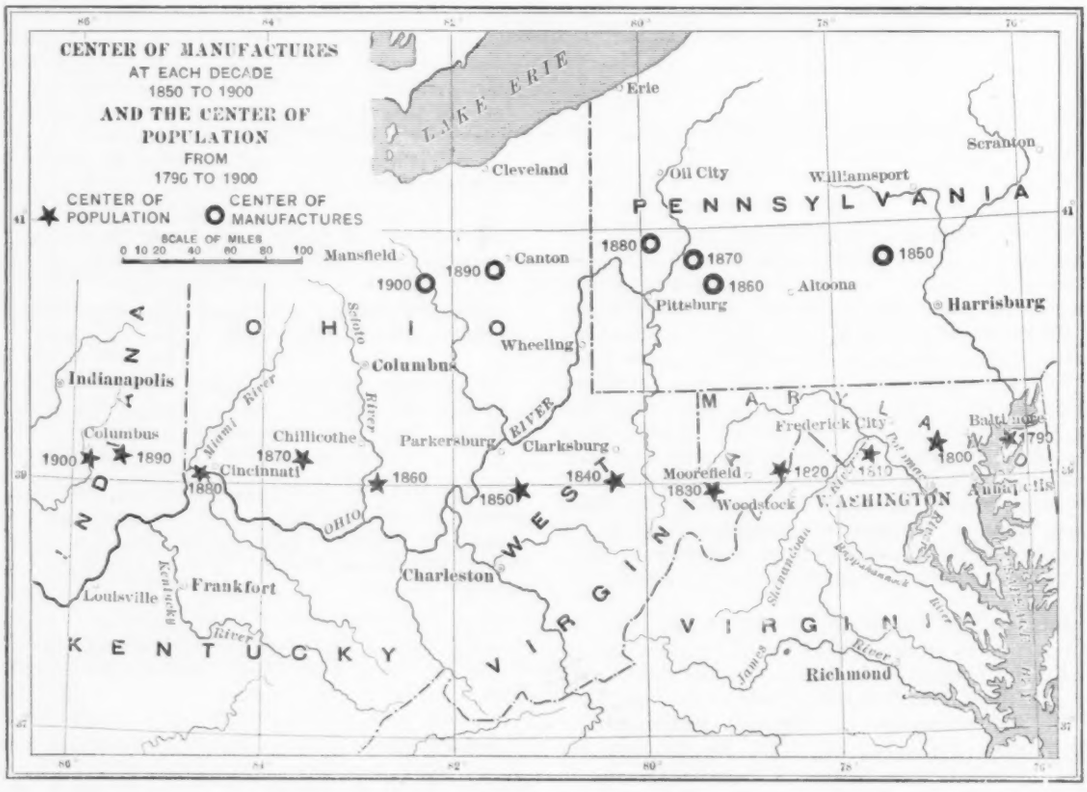
United States at different periods. It will be observed that with both centers the movement has been spreading westward, with but little inclination to the north or south with the progress of time. The manufactures center has kept close to 41 degrees latitude north and always south of it, while the population center has maintained even closer relations with 39 degrees latitude north, most of the time a few miles north of it. In 1830 and 1850 the center managed to get over the line and a very short distance south.

The center of manufactures in both 1900 and 1905 was in Stark County, Ohio, in the former year south of Canton and in the latter near Wilmot. In comparing the center at the census of 1905 with that of 1900 it should be explained that the computations were made on different bases. For the census of 1900 the statistics of manufactures were published for counties, and the manufacturing center of the country was computed on the basis of the county showing. For the census of 1905 the statistics were not published by counties, but by cities of over 8000 population, these cities being 544 in number. Thus the center of urban manufactures for 1900, using the city as a unit, falls approximately 49 miles east of the center computed in 1900, using the county as a unit and including all manufactures. The center of urban manufactures in 1905 was located west of the center for 1900, approximately 13.8 miles. The center of manufactures of these cities, or of the urban manufactures, in 1900 was located 6.7 miles south of Canton, Ohio, or in latitude 40° 42′ 36″ north, and longitude 81° 22′ 12″ west. The location for 1905 was latitude 40° 39′ 36″ north, and longitude 81° 38′ 24″ west, near Wilmot, a small town in the extreme southwestern corner of Stark County.

The center of manufactures in 1850 was 5 miles east and 6 miles north of Mifflintown, Pa.; in 1860, 5.5 miles west and 6.5 miles south of Indiana, Pa.; in 1870, 6 miles east and 3.75 miles south of Kittanning, Pa.; in 1880, 2 miles east and 2 miles south of Butler, Pa.. In 1890 it moved into Ohio, where it has since remained.

Russwin Hardware.

THE RUSSELL & ERWIN MFG. COMPANY, New Britain, Conn., and 94-98 Lafayette street, New York, has just issued an elegantly printed book of the loose leaf type, containing illustrations of buildings equipped with Russwin Hardware of its manufacture. The leaves are 9 by 7 in. in size, but one engraving ap-



Centers of Manufactures and Population in the United States.

pearing on a leaf. The names of architects and contractors are given in addition to name of building. The structures shown are located all over the country, from the principal Atlantic seaboard cities to Seattle and Los

Angeles on the Pacific Coast, and from Toronto and Lake Minnetonka, south, including fine hotels, residences, office buildings, apartment houses, clubs, garages, public libraries, museums, high schools, railroad terminals, churches and numerous other public buildings.

THE COMMONWEALTH OF AUSTRALIA AND THE DOMINION OF NEW ZEALAND.

Second Article.

BY JOHN L. SARDY.

Before the Commonwealth each colony had its own system of duties, and to commercial travelers with samples it was no fun. All that is changed now. Once in the Commonwealth the traveler can pass from State to State unmolested. Last year a new tariff went into effect and there has been an uproar ever since. It is a protective tariff and in a way suits Victoria, which is more or less a manufacturing State.

Australasia as a whole is an agricultural and mining country, and imports the great bulk of the manufactured articles used, hence the buyers of these products raise a howl over the increased duties.

Labor Party Holds Balance of Power.

In the Commonwealth Parliament the Labor Party hold the balance of power and dictate to the Government. The present tariff is in favor of the workers in the larger cities without consideration for the farmer tilling the great Australian fields, the man in fact, who is the bone and sinew of the country. The legislation is for a class only. The duty may prove in a way prohibitive; indeed, it is already so on some articles, and it is a moot question whether it will be beneficial to the Commonwealth at large. On certain lines importation will diminish or cease altogether, being supplanted by inferior goods locally made, the price being kept just within the importing limit. Thus the user pays about as much as the imported article costs for a domestic production, which is not so well made and will probably have to be replaced more frequently. He is a loser and so is the Government. The idea of the Labor Party is to make up for this loss of Government revenue by direct taxation. This would get at the land owners and would take the form of a progressive land tax, which would practically amount to confiscation, as there is already in existence a Lands Resumption Act, which empowers the Government to resume and pay for at a fair valuation any large estates desired for closer settlement. The tax proposed is of such a nature that land owners would probably let their estates go rather than pay it.

In a speech by Sir William Lyne, the Commonwealth Treasurer, who is assuming the difficult job of trying to please everybody, he said:

> The idea was that the employee should be protected as well as the manufacturer, and while duties were imposed for the protection of the manufacturer as a matter of form, they put an excise duty on the manufacturer, which could not be collected so long as the manufacturer conformed to the ordinary rules of wages in each State. They asked him to put on his goods a mark, a Commonwealth trademark, which was a recognition of the fact that he was paying a proper wage, an indication to everybody that he was recognized as a man who was receiving the protection of the tariff, and was paying a proper and living wage. They would appoint an excise board which would probably be called a board of trade, whose function would be to inquire into matters and see that everything was going on all right.

From this it would appear that the lot of the Australian manufacturer is unlikely to be a happy one, and the importer bears him company.

How the Tariff Went Into Effect.

The new protective tariff went into effect August 9, 1907. No previous notice had been given. Importers were totally unaware what changes were to be made. On that day in August, when Sir William Lyne finished reading the new tariff, it at once became operative, although it was not law until subsequently passed by Parliament, which has now been done under a somewhat modified form. Fremantle, the port for Perth, western Australia, is the first Australian port arrived at by steamers from England. A steamer arrives before the new tariff has been introduced, carrying a cargo, some of which is free under the old tariff. She discharges part of her cargo at Fremantle, does the same as she proceeds to Adelaide and Melbourne; but by the time she arrives at Sydney the new tariff act has been read in Parliament, imposing a duty, say, of 25 per cent. on articles which were formerly free, and the unfortunate importer in Sydney has to pay it, while his rivals at the other ports do not.

Even worse yet. The steamer may actually be in port, but if not passed through the customs when the Commonwealth Treasurer gets up and announces the new tariff, the goods on board become at once subject to the revised duties. Furthermore, where an article was dutiable under the old tariff and made free under the new one, importers have to pay the old duty pending a decision in Parliament, but where an article was free and under the new tariff became dutiable, the duty must be paid.

Another thing. On all dutiable goods imported 10 per cent. is added to the invoice, and the ad valorem duty is collected on this increased value. Again, a manufacturer's discount for export must not be greater than the discount allowed for home trade, and the collector takes it upon himself to decide what the discount should be. There is now pending a dispute between the importers and the Collector on a certain American Hardware line, which for many years has had and is still having the largest sale of its kind throughout Australasia. The manufacturers' discount is 50 and 10 per cent., whether for home or foreign trade. Every one in the Hardware business knows this, but the collector in Melbourne not being in the Hardware business does not know, so he assumes that discount to be a special one for export and only passes the goods on the basis of 40 per cent. discount. Affidavits from the manufacturer and his representative in Australia will no doubt in time correct this, but in the meantime duties are paid under protest and importers are at sea.

Imports Will Diminish.

The tariff in a way is preferential on British made goods, but it is doubtful if England will benefit materially, as the duties have been increased to such an extent that importations will probably decrease. At any rate, one thing is certain, the United States and other countries, not British, will suffer. As an instance, a well-known importing Hardware firm in Brisbane had to cable to New York to stop shipment of about $5000 worth of Wagon Wheels, on account of the duty being raised to the equivalent of about $8 per set of four against about $1.50 under the old tariff. Another instance: Huge quantities of Wire Netting are imported on account of the rabbit pest. The new tariff imposed a duty of 25 per cent., whereat the Australian farmer rose up in his wrath and raised such a row that Parliament had to change the duty to 5 per cent. on British Netting and 10 per cent. on foreign. There has been an advance all along the line, and Hardware gets its full share of it.

Freak Duty on Magazines.

On all imported magazines whose advertisements constitute over one-fifth of the whole a tax levied of 6 pence (12 cents) per pound. Unless this be remedied by Parliament the importations of magazines will be seriously curtailed, and not only this. Our Hardware manufacturers who advertise in magazines are not likely to benefit as the newspaper importing agent tears out the advertisements, presumably in the custom house, so as to save the duty. It is said the object of this duty on the advertising portion of magazines is to prevent people in the Commonwealth ordering things abroad to the detriment of Australian labor. The fact is lost sight of that clever advertisements in magazines or a publication like *The Iron Age* often gives ideas to manufacturers, thus helping labor instead of retarding it.

Tax on Catalogues and Price-Lists Repealed.

The tariff also placed a duty of 12 cents per pound on all catalogues, price-lists and other similar advertising

matter imported into the country through the regular shipping channels or sent through the mails. Many American catalogues, single copies, sent through the post were held up for this duty and consequently failed to reach the persons to whom they were addressed. This obstacle to the distribution of American advertising matter in Australia has been removed. An amendment to the tariff, taking effect December 9, 1907, provides that "catalogues, price-lists, show cards, or pictures, issued by or referring to the goods of any manufacturer or producer not having an established place of business in Australia" shall be exempt from all customs duty.

PAINT LEGISLATION.

AT the recent annual meeting of the New York State Retail Hardware Association E. J. Cornish of the Carter White Lead Company, Chicago, made an address on legislation affecting the manufacture and marketing of Paint. In view of the interest and importance of the subject we take pleasure in giving the following liberal extracts from Mr. Cornish's address:

Paint legislation is by no means as recent as some of us may think. As long as 8 or 10 years ago an ill-digested bill was introduced in the Legislature of Michigan by a representative who happened also to be a Paint manufacturer in a small way. It was defeated by its evident absurdity and inadequacy. Minnesota also tried its hand at the question a little later, and finally succeeded in getting a law which simply amounted to a prohibition of the word "pure" on Paints and colors that were not pure. In the spring of 1905, however, North Dakota, with the advice of its highly competent Food Commissioner, Prof. E. F. Ladd, unexpectedly adopted the measure which gave the present impetus to the entire proposition. You are doubtless familiar with this law. It provides that all Paints containing materials other than pure carbonate white lead, pure zinc oxide, pure tinting colors, pure linseed oil, pure turpentine and japan driers shall bear a complete formula label.

This law was attacked in the United States courts on the ground that it is unjustly discriminating in its character, and, therefore, in violation of the Fourteenth Amendment to the Federal Constitution. The case was carried to the Supreme Court and was recently decided in favor of the State, on the ground that a State has the right to adopt even ridiculous precautions for the protection of its citizens. The legal status of this law is therefore finally settled. I wish, however, to point out to your discernment a few of the reasons why in the view of Paint manufacturers its provisions are unreasonable, burdensome and in contravention of the public good. I wish also to call your attention to a measure by which all the good results contemplated in this law are assured, without hampering industry, or interposing an arbitrary limit to technical progress. Let us acknowledge, first of all, that the demand for Paint legislation is not due to mere irrational caprice; that it is the consequence of

A Natural Revolt Against Trade Abuses,

and that if all Paint manufacturers had always been honest Paint legislation would never have been proposed. That conditions in this particular industry have been so unexceptionally bad as to warrant its selection for the bad eminence of adverse legislation I do not for a moment admit. That the consequences of individual misrepresentation in this commodity are sufficiently serious to warrant its classification with foods and drugs for legislative restriction I believe you will admit is a ridiculous assumption. If it were to be regulated in this sense it would be far more rational for our legislators to follow the example of France and other European countries in surrounding the use of certain pigments dangerous to health with legal restrictions, than to restrict or penalize the use of harmless adulterants.

The North Dakota statute assumes, first of all, that white lead and zinc oxide only among the white pigments are pure Paint, and that there is a natural standard of purity in colors; that purity is synonymous with quality, and that, therefore, the consumer is protected by requiring a formula label on impure Paints.

Were these assumptions correct it would have been far simpler, wiser and more serviceable to the Paint consumers of the State to establish one legal formula for Paints and prohibit the sale in the State of any others.

But it is not true, or if true, no one has as yet discovered the truth, and the weight of technical authorities is on the other side. I think I am safe in asserting that there is not in the United States a single large industrial consumer of paint (including the great railroads) that does not habitually use in preference paints which are classed as adulterated under the North Dakota law. Dr. C. B. Dudley, Chief Chemist of the Pennsylvania Railroad, who has probably gone more systematically and more intelligently into this question than an other investigator not interested in the manufacture of paint, has repeatedly stated in writing and on the witness stand his conviction, based on experience and test, that the so-called adulterated paints give better service and better protection than the so-called pure paints; and every disinterested technical authority expresses the same conclusion.

It is generally acknowledged and in private it is acknowledged, by those manufacturers of white lead whose opinion is based on practical knowledge, that the addition of oxide of zinc does improve the wearing qualities as well as other service qualities of white lead. It is quite probable that in many cases this combination makes the best obtainable white paint; but there are other conditions in which the use of white lead is technically inadmissible and others in which the use of zinc is at least inadvisable. Therefore it is not proper to standardize lead and zinc to the exclusion of other available and useful pigments, even if it were wise thus to close the path of progress and invention.

It Is Held by a Large Majority of Paint Manufacturers

that the introduction of an inert reinforcing pigment like sulphate of barium, silica, silicate of aluminum, sulphate of calcium, &c., into the white paint base greatly improves the wearing qualities of the paint film by reducing the chemical effect of the more active pigments on linseed oil: and in this Dr. Dudley fully agrees with them.

Moreover, it is not beyond the bounds of reason to suppose that the science of paint manufacture will continue to advance in the future as it has in the past, and that some proportion of this advance will be in the direction of new inventions and new discoveries. Suppose that North Dakota had been in existence about the middle of the past century, and had then enacted a paint law on the lines of its present statute. It would have read about as follows: All paint containing ingredients other than carbonate of lead corroded by means of fermenting manure, pure vegetable colors, the natural earth colors, cold pressed linseed and gold size japan shall be labeled, &c.

Since the Middle of the Last Century

zinc oxide, the chemical lakes, chrome green, hot pressed linseed oil and the modern dryers have all made their way into use against conservatism and competition, and it was only because the North Dakota law found them intrenched that they are permitted to be used without the incriminating label.

Other pigments and vehicles of more recent introduction, because of their mere youth, were branded with the mark of dishonor. Such are, to mention merely a few—sublimed white lead, zinc lead, lithopone, Chica Wood oil and the highly welcome asphaltum spirits, which was a godsend in view of the approaching exhaustion of our Southern pine forests.

However, the example of North Dakota and the high authority and character of its law's sponsor, Professor Ladd, immediately stimulated other States into activity, so that last year, with about two-thirds of the legislatures in session, something like 66 Paint laws were introduced in 15 States, all of them based upon the North Dakota law, but most of them differing therefrom in important particulars.

The Paint manufacturers, realizing from their experiences in North Dakota and from their observations that something of the kind would probably confront them, decided that for self-preservation three things were essential: First, that they should have early information of any proposed legislation; second, that the provisions of any laws enacted should be uniform; and third, that these laws should be equitable and should not require technical impossibilities. I may remark in passing that it is due rather to Professor Ladd's sensible application of the law of North Dakota than to the provisions of the law itself that the sale of many excellent Paints is still practicable in that State. The manufacturers thought they recognized the existence of a

Genuine Demand for Paint Legislation,

and when the Master Painters' Association and the National Paint, Oil and Varnish Association proposed a joint conference on the subject they gladly consented.

But I am running somewhat ahead of my topic. It was agreed that while legislation was undesirable and

unwarranted by the facts, it should be accepted if reasonable, and that not 1 cent should be spent for corruption or prevention. A bureau was organized which in the course of the year examined in detail 66,000 bills on every conceivable topic, and when a Paint bill appeared, either alone or as part of another measure, a hearing was arranged by wire and a representative dispatched to argue the matter.

In every case the first question asked of this representative was, "If you do not like this measure, what would you propose?" The demand for legislation existed, but the legislators were willing to listen to reason.

Recommended Bill.

Out of this fact grew the comprehensive measure adopted with full approval of the conference to which I have alluded, as the fairest measure for all concerned that could be devised. It has the complete indorsement of the joint committee representing the International Association of Master House Painters and Decorators of the United States and Canada, the National Paint, Oil & Varnish Association and the Paint Manufacturers' Association of the United States, and I trust that after you have studied it carefully, it will receive yours. Except for variations in verbiage it is the law now in force in Iowa, South Dakota and Minnesota. It has been accepted by Representative Marshall of North Dakota as the bill which he proposes to introduce in Congress, and was accepted last year as a more equitable substitute for the original bills introduced in the legislatures of several States, including New York and Pennsylvania.

This bill includes some important provisions which are wanting in the North Dakota statute while differing therefrom in other important particulars. In requiring the entire formula to be placed on every package it guards against misrepresentation and fraud on the part of the manufacturer (the buyer knows from the formula exactly what he is purchasing in the sealed package), but at the same time it does not attempt, like the North Dakota law, to set up a standard which will enable the manufacturers of certain products to advertise, as they did in North Dakota, "If I bear a formula label it is a warning that I am impure—don't buy me." It goes as far as a law should go, in compelling truthfulness of statement, without lending the powerful influence of the law to the backing of any particular commercial proposition. The law should be a guardian, not a wet nurse.

In the Case of Tinted Paints,

while it is made compulsory to show the combined percentage of coloring matter, and the analysis of each pigment used, it is not necessary to give the percentage of each individual color. This provision is made necessary by the fact that the colors differ in tinting strength, and that tinting is done by the eye and not by weight or measure. Thus, in a given tint of pearl gray, for example, there may be in one lot a little more or a little less blue, according to the strength of the pure blue, and if the percentage of each individual tinting color were required, it would mean a separate analysis and a different label for every fresh batch of the tint produced.

I wish to call your attention to another provision which is absent from the North Dakota law, but present in this: Section 4 requires

The Net Contents of the Package to Be Stated

on the container. To my mind this provision is more important than all the rest together. The man who gives short weight or short measure may defraud the buyer more seriously than the man who misrepresents his formula. If a manufacturer states that his goods consist of lead and zinc, while in reality they consist of zinc and barytes, he may be really selling better paint than if he told the truth, but the man who sells seven pints for a gallon is defrauding the buyer, no matter what the formula. This provision is now a part of the law in Iowa and South Dakota, and should appear in any paint law hereafter adopted.

The majority of the leading paint manufacturers have not waited for laws to compel honesty; but are preparing as rapidly as possible to put out all their products in full measures and net weights, and those who do not adopt this simple precaution of honesty should be compelled to do so, either by public opinion or by law. Many manufacturers are also anticipating Paint legislation by printing complete formulas on their labels. Others take the reasonable ground that their formulas are the fruit of experience and expenditure and that they should not be compelled to make them public. Be that is it may, it is obvious that if we are to have legislation, when we have it it should be as far as possible uniform, otherwise the Paint manufacturing industry would be thrown into inextricable confusion. A label which is legal in one State must be legal in all the States.

In the legislature of New York late last spring Representative G. H. Whitney introduced a Paint law. On being made acquainted with the provisions and purposes of the bill which has just been read, he promptly accepted it as a substitute for his own. Your representative found him to be fair minded and intelligent. It is not impossible that he may reintroduce the measure this year. If he does, and if you deem legislation on the subject desirable or advisable, I trust you will lend him your support.

Personally, I deem it a matter of indifference whether New York legislates on the subject or not, so long as any law adopted follows the provisions of the proposed act. There are many who differ from me in opinion, but my attitude is based on the fact that we are going to have such laws, here and there in spots, whether we want them or not. Now, it is obvious that with a law in New Jersey and Massachusetts and Ohio, for example, it will help the New York manufacturers very little if New York and Pennsylvania refrain. If he is compelled to print his formulas for the three States named he cannot afford to leave them off his cans in neighboring States. So, as I have said, I regard the attitude of any individual State as a negligible factor.

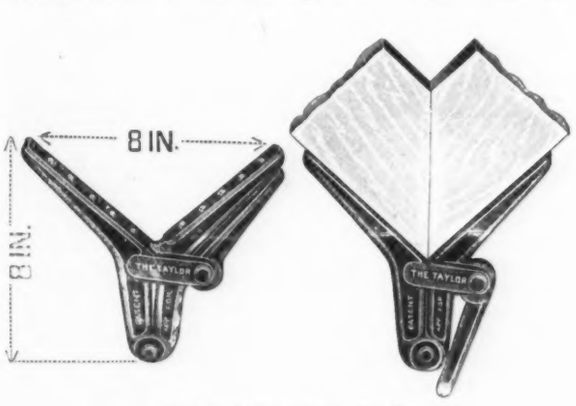
A Word Now as to the Proposed National Legislation

and I shall have taxed your patience far enough. First of all, I do not believe that we shall have any Paint legislation from the present Congress. There are other things of more importance to engage the attention of our law givers. Representative Marshall's bill, unless he amends it invidiously, is as fair as such a law can be made. But it should be remembered first that Paint legislation is novel and as yet untried—we want to find out by actual experience how these laws work in the States before we petrify them into a rigid national law; secondly, the Federal law runs only in interstate commerce and has no mandatory power within the borders of any State. After the goods are on the shelves in the State the State has full control of them. It can require a label entirely different from that required by the Federal law, and in that event the cans might have to be enlarged to accommodate the labels. Secondly, Paint manufacturers are having enough trouble and expense at the present moment to comply with the State law, without making confusion worse confounded by piling a Federal law on the back of the overburdened animal. Business in all lines is sufficiently embarrassed at the moment without further complications.

On behalf of practically the entire Paint manufacturing trade of the United States, I urge you to lend your powerful influence toward the discouragement of federal legislation at this time. After the State laws have been tried out and perfected so that the consumer shall receive the fullest measure of protection with the least resultant injury to legitimate commerce and industry and the least possible interdiction of competition, progress and improvement, it will be time—and not until then—to embody this wisdom of experience in to a federal statute.

Taylor Miter Clamp, No. 36.

The accompanying diagram illustrates the Taylor miter clamp, made by James L. Taylor Mfg. Company, Bloomfield, N. J. The castings are of refined malleable



Taylor Miter Clamp, No. 36.

iron and the gripping pins of best quality Stubbs' steel. The eccentric is so designed that the first part of the motion brings the jaw quickly into engagement and the latter part closes more slowly, affording greater holding

power. A spring action holds the clamp open, always ready for use. In the construction of this device lightness and strength were especially studied. The jaws are planed true and fitted to hold the work exactly square when closed. The pins are only large enough to give a grip that prevents slipping.

A Universal Family Sewing Machine Motor.

The Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., has placed upon the market a Motor with all the necessary attachments for fitting any one of the standard types of Sewing Machines, as illustrated herewith. This Motor can be applied equally as well on drop head and stationary head machines, and may be fitted to new or old machines. Full instructions

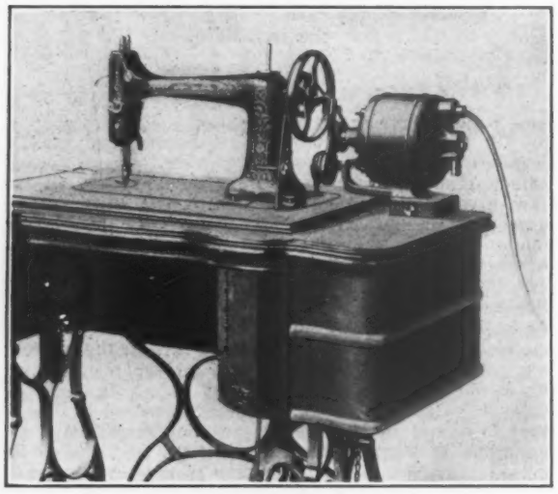


Fig. 1.—Drop Head Sewing Machine with Alternating Current Motor.

for mounting and operating the Motor are supplied with each outfit. The Motor is mounted on the top of the table, and runs at a constant speed. The speed of the needle is regulated by increasing or decreasing the belt tension. A special brake and belt tightener arm is attached by chain to the foot pedal, which should be disconnected from the large balance wheel. Pressure on the

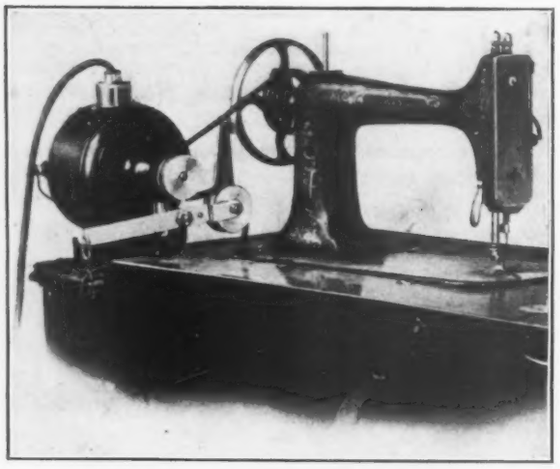


Fig. 2.—Sewing Machine with Direct Current Motor.

pedal releases the brake, tightens the belt and starts the machine. It is stated that perfect regulation of the speed may be obtained after a few minutes' practice. In fact, the needle may be stopped, it is said, with greater promptness than when running from the foot pedal, and the usual control over the speed is readily learned. The entire outfit presents a neat appearance, being well finished in black japan with nickel trimmings. The Motor and its attachments are especially well made, and require only a minimum of care and of attention in operation. These machines are made for 100-110 volt alternating current, 60 cycles, and for 100-110 direct current circuits.

Electric Glue Pot.

The electric glue pot here illustrated has recently been placed on the market by the General Electric Company. It embodies a new feature of design, namely, the elimination of the water jacket. The water jacket is a necessary part of the ordinary glue pot, inasmuch as this water bath serves not only to distribute the heat evenly to all parts of the glue, but also prevents it from

Fig. 1.—Two-Qt. Electric Glue Pot Connected.

becoming overheated. The elimination of this feature in the General Electric glue pot has been made possible by the adoption of a casting of pure aluminum, which forms the glue pot proper. The high conductivity for heat, together with the proper design of the heating unit and the correct proportioning of radiating surface, combine to keep the glue at the proper temperature, although the maximum temperature of the exterior and bottom of the pot never exceeds 180 deg. F. The heating element is of

Fig. 2.—Two-Qt. Electric Glue Pot Disconnected, Showing Parts, &c.

the well known cartridge type, which is said to be characterized by simplicity, renewability and long life. The company claims that a saving in electricity has resulted by the omission of the water jacket amounting to as much as 50 per cent. in the smaller sizes. It particularly recommends this glue pot for carpenters, pattern makers, book binderies, &c.

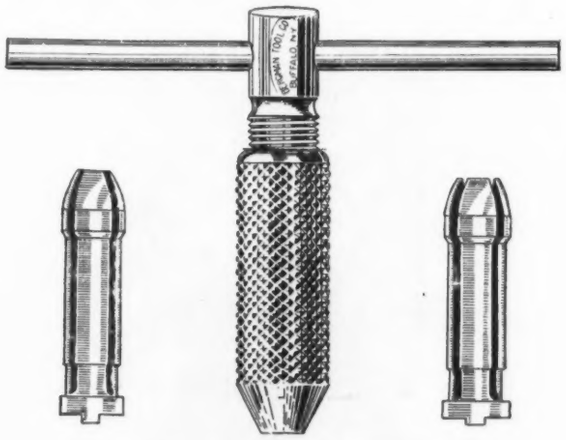
Forsyth Mfg. Company.

The Forsyth Mfg. Company, 308-314 Terrace, Buffalo, N. Y., has made a number of additions to its lines of bathroom accessories and hardware specialties. Among these as shown in a catalogue lately issued, are match safes, always ready wrenches, tumbler holders, soap trays, &c.

The Farmers' Hardware Company, Sweetwater, Texas, has started a branch store at Blackwell, handling Agricultural Implements, Buggies, Shelf Hardware and Queensware. The company has erected a rock building, 50 x 80 ft. in size, with plate glass front.

Combination Tap Wrench.

The Bergman Hardware & Tool Mfg. Company, Buffalo, N. Y., is manufacturing the tool shown in the accompanying illustration to supply the demand for a tap wrench that will take all taps up to medium size. It is furnished



Tap Wrench with Two Collets.

with two collets made of 60-carbon tool steel, the smaller holding taps from 1-16 to 3-16 in. and the larger from 3-16 to ⅜ in. Drills from 1-6 to ¼ in. are accommodated. The tools are highly polished and each is packed in an individual box.

Bennett Adjustable Scraper.

The Bennett Mfg. Company, 420 Auburn avenue, Buffalo, N. Y., whose sales agents for Greater New York are Warner & Haviland, 49 Warren street, has put on the market the Bennett adjustable scraper for cabinet work, parquet floors, &c., as here illustrated. Aside from the quality of the entire tool and care with which it is made marked characteristics of it are rigidity of blade, strong grip and absence of chatter. The blade of tool steel is 3 x 5 in., and the company asserts it can be used to the last ½ in. No special blade for renewal is required other

Bennett Adjustable Wood Scraper.

than of suitable dimensions and quality. The handle working on ball and socket principle, can be adjusted to any necessary position by a few turns of the handle or detached to save space. The 10½-in. hardwood handle of practical pattern is polished and varnished natural. At the working end there is a turned head ¼ x 2 in. carriage bolt, which works in a pinioned nut imbedded in the handle, two sides of the head being ground off a total of ⅛ in. to permit it to enter the socket slot in the rear clamp, which is forged from ⅛-in. steel. The clamp and ball socket are formed of one piece of metal, the socket being 1 in. in diameter and 9-16 in. deep, outside measurements. To reinforce this part of the tool there is a 1-in. tapered heavy malleable iron ferrule, thus providing a strong construction at this important point. The front clamp also made of ⅛-in. sheet steel is tightened on the scraper blade by a stout milled head machine screw ¼ x ⅞ in. under the head and 9-16 in. diameter head. The wood grip at top of blade is 3 x 1 1-16 in., and is slotted ⅜ in. to admit the scraper on whichever end used. The clamps, binding screw and ferrule are polished and nickel plated, and the tool is well put up in white tissue paper and double pasteboard box singly.

The Ideal Freezer.

An ice cream freezer possessing the unique feature of being operated without gear mechanism is manufactured by the Commercial Can Company, 101-105 North Lincoln street, Chicago. Fig. 1 of the accompanying illustrations shows the machine ready for operation. In Fig. 2 it is shown in vertical position ready for filling, and Fig. 3 shows the disassembled parts and the interior of the freezer can. The tub is made of indurated fiber and has a tube inserted in the bottom at the center, which serves as a sleeve bearing for the shaft upon which it revolves. The shaft is bent so that when in position for operation the tub is inclined at an angle of about 45 degrees and is fastened to a baseboard 8 x 14 in. The freezer is held in position by a wire lock at the base of the shaft, and the baseboard is secured to the table by a clamp. Ice and salt are introduced through a screw top opening into the space between the cam chamber and the tub. The ice is not in direct contact with the can, which being evenly balanced and free from the binding and friction of lumpy ice is easily revolved by use of the knob shown on the top of the freezer in Fig. 1. The can is readily restored to a perpendicular position for filling by releasing the fastening from the shank of the shaft. A scraper is provided which facilitates the free contact of the contents with the interior surface of the can. It is stated that cream can be frozen in 5 min. or less, according to quantity. The freezer is made in one size only, having a capacity of one gallon, but will work effectively when only partly filled.

Fig. 1.—The Ideal Freezer.

Fig. 2.—Position for Filling.

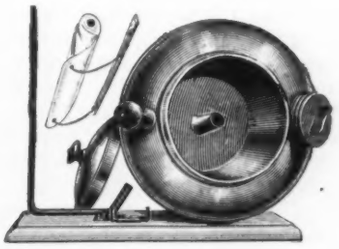


Fig. 3.—Disassembled Parts and Interior.

The Detroit Shipbuilding Company, Detroit, Mich., has issued an illustrated descriptive price-list, C, 108 pages, of special marine hardware, oil and grease cups, life rafts and life boats. Among recent additions to the line of marine hardware are screen door locks, towel racks with teeth, bracket comb, brush, tumbler and pitcher holders, swivel door hooks, three and four prong coat hooks, door fasteners and bumpers, whistle pulls, bathtub and lavatory water heaters, telemotor flange unions, iron body brass plug air cocks, self-bailing plugs, elbow oil cups and iron body dope cups. The catalogue is accompanied by a discount sheet.

Jersey Vises and Display Stand.

The Leavens Mfg. Company, Vineland, N. J., represented in New York by Warner & Haviland, 49 Warren street, has recently put on the market the Jersey vises in three styles, two of which are here illustrated. These vises are referred to as of high grade and low price, especial care and attention being given to details, unusual in vises sold at such prices, although there are several patented features peculiar to these goods. The lowest in price are six all-clamp bottom vises, identical in appearance to the vises illustrated in Fig. 1, but having plain iron jaws, the widths of which are 1½, 1¾, 2, 2¼, 2½ and 3 in., weighing respectively 3, 3¼, 3½, 4, 5 and 8¾ lb. Fig. 1 illustrates exactly the same vise in the same sizes and weights, but has steel faced jaws, and they are a little higher in price. Fig. 2 reproduces the swivel base style, with steel faced jaws, the widths of which are 1¾, 2, 2¼, 2½ and 3 in., weighing complete 3, 3½, 4½, 5½ and

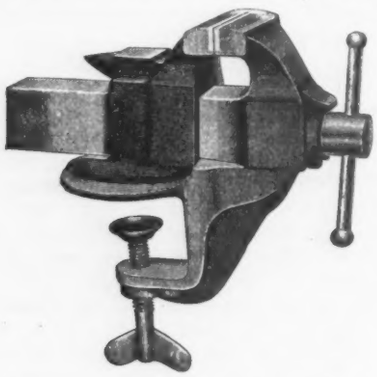


Fig. 1.—Jersey All-Clamp Bottom Steel Faced Vise.

9½ lb. each. All three groups have a solid steel polished head, square thread screw and lever handle proportioned to the service it should properly render. The interior nut of malleable iron is well secured, and yet flexible enough to allow of some lateral and vertical play which insures an easy movement of the screw through the nut, there being also a stout wrought iron pin 3-16 x ⅜ in. driven through the vise base back of the nut to keep it securely in position. All jaws and slides are ground and properly fitted, well polished, and the bodies of the vises finished in a brown japan baked on instead of air dried. The swivels on both all-clamp bottom styles represented by Fig. 1, attached to the malleable iron thumbscrews, are so made, it is said, that they can always be depended upon to swivel with a free movement. This patented swivel of

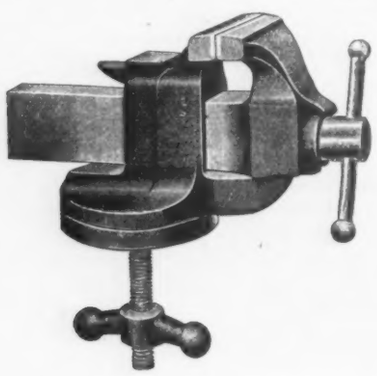


Fig. 2.—Similar Vise, Swiveled Bottom.

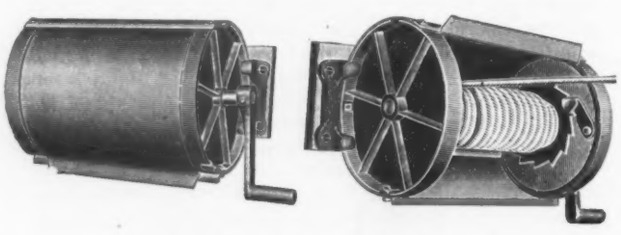
malleable iron is cast with a slit from center to circumference and closed in assembling on the inverted cone shaped end of screw. The recess feature in the bottom of the slide is likewise patented, which admits the one-piece screw in the process of assembling. All vises are wrapped singly in two or three sheets of strong hardware paper, according to sizes, thus protecting the hard, dry finish and enhancing the salability of the vises, which can be kept fresh until they reach the consumer. Each vise has a horn and polished anvil, and all parts are interchangeable. As an earnest of its faith in the goods, the company offers to send an assortment of three dozen vises to any reliable merchant in the United States on approval, which may be returned at the company's expense if not as represented and entirely satisfactory. In this connection the company has originated a unique display stand,

Fig. 3.—Jersey Vise Rotary Display Stand.

Fig. 3, on which to conveniently show its line of vises; one of the stands being sent gratis with first order for assortment No. 14 of 36 vises. Two other assortments, Nos. 12 of 24 vises and 10 of 18 vises are put up, with which stands are sent but for which a partial charge is made. There are two lettered ornamental cast standards having a spread both ways to better sustain the vises clamped to an oak rim, the dimensions of which are 15¼ x 2 x ⅝ in. The four wheel spokes are ¼ in. stove rods, screwed into a tapered iron hub 1⅝ in. center diameter. Through this hub runs a machined ¾-in. spindle held at each standard bearing by square head setscrews, thus permitting the wheel with its vises to revolve. The distance from base to top of wheel is 21 in., with room enough below for vises to clear as the display revolves. The bottom width of both standards in line with the wheel is 15¼ in., and the lateral spread of 8½ in. at top increases to 13 in. at bottom, thus affording a good foundation.

Murchison Clothes Line Reel.

A new clothes line reel manufactured by the Peters Pump Company, Kewanee, Ill., and here illustrated, af-



The Murchison Clothes Line Reel.

fords a convenient means for stretching and storing clothes lines. The ends, reel, ratchet and crank are made of cast iron inclosed in a casing of galvanized sheet steel, in the front of which is a sliding door which when closed protects the line from exposure to the weather. Cast iron lugs perforated with screw holes are attached to the back of the reel for the purpose of securing it to the house or other convenient place. When the line is drawn out and fastened in position it is easily tightened to the desired tension by a few turns of the ratchet crank. Besides the protection it affords to the line and the saving in time and labor effected, the device is durably constructed and neat in appearance.

Pioneer Portable Pipe and Bench Vises.

Schuchardt & Schutte, 136 Liberty street, New York, have just put on the market in this country, their Pioneer, No. 2, portable combined bench and pipe vises. The illustrations show it set up for use, Fig. 1, and in knocked down form for portability, Fig. 2. The outfit consists of a pipe vise mounted on a folding steel frame with hinged platform, on which to stand at work and hold securely. The frame of the platform is made of strong U iron. The two side supports carry the vise, back of which a ¾-in. pipe (1⅛ in. outside diameter), forms the third support. This support is held in position by means of a hinged tool table 15 x 12 in., the latter having a rim around it to prevent tools from rolling off. The pipe vise is made of crucible tool steel with tempered jaws. There is a small bridge under the pipe vise to assist in holding the bench vise, the latter being also made of crucible tool steel and tempered. The bench vise, with its hooked tongue, is suspended in the base of the opened pipe vise so as to bring the lower pivot in the hole of the bridge, thus fastening the vise as firmly as if it were part of the frame. The changing of the vise requires but a few seconds. The bench vise jaws are 4 in. wide, and will take work easily up to 3⅝ in. The steel and wood platform is 26 in. front to back, and has a spread of 31 in. where hinged to legs. When using the pipe vise for large pipe, necessitating the attention of two workmen, each stands with a foot on the platform. The metal parts have a gray machine tool finish. The Pioneer No. 1 outfit, with pipe vise only, weighs complete 50 lb.; the Pioneer No. 2, with pipe and bench vises combined, weighs 85 lb., the pipe vise in both instances being capable of taking up to 2 in. pipe.

Fig. 1.—Pioneer, No. 2, Portable Combined Pipe and Bench Vises.

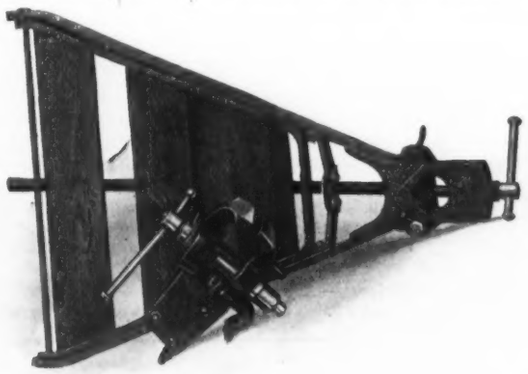


Fig. 2.—Pioneer Outfit, Knocked Down for Carrying or Transporting.

C. Doering & Sons.

C. Doering & Son, Chicago, whose product covers an extensive line of sheet metal goods, tanks, &c., are making a specialty of sheet steel equipment for stores, warehouses, shops and stockrooms, consisting of sectional shelving, shelf drawers, &c. Such equipment is made of 20, 18 or 16 gauge steel and may be had in various styles and subdivisions to suit particular requirements. The firm also makes an extensive line of sheet metal supplies for machine shops, foundries, &c., including pans, tote boxes, tool boxes, barrels, trucks, wheelbarrows, &c.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

	℔ gal
Linseed, State and Western, raw, in bbls.	.43 @.42
City, Boiled, in bbls.	.44 @.45
City, Raw, in bbls.	.43 @.44
Raw, Calcutta, in bbls.	.70 @..
Lard, Prime, Winter	.65 @.70
Extra No. 1	.55 @.57
No. 1	.47 @.52
Cotton-seed, Crude, f.o.b. mill	.30 @.30½
Summer Yellow, prime	.38¾@.39¼
Summer White	.40¾@.41
Yellow Winter	.41½@.42
Tallow, Prime	.58 @.60
Menhaden, Brown, Strained	.41 @.42
Light Strained	.41 @.42
Northern	@..
Southern	.37 @..
Cocoanut, Ceylon	℔ lb 6½@ 7
Cochin	℔ lb 7¾@ 8
Cod, Domestic, Prime	.42 @.44
Newfoundland	.44 @.46
Red, Elaine	.39 @.40
Saponified	℔ lb 5¾@ 5½
Olive, Yellow	.67 @.69
Neatsfoot, Prime	.55 @.58
Palm, Lagos	℔ lb 6 @ 6¼

Mineral Oils—

	℔ gal.
Black, 29 gravity, 25@30 cold test	.13 @13½
29 gravity, 15 cold test	.13½@14
Summer	.12½@13
Cylinder, light filtered	.20½@21
Dark, filtered	.18 @19
Paraffine, 903-907 sp. gravity	.14½@15
903 sp. gravity	.13½@14
883 sp. gravity	.11 @11½
Red	.13½@14

Miscellaneous—

Barytes:	
White, Foreign	℔ ton $18.50@20.50
Amer. floated	℔ ton 19.00@20.00
Off color	℔ ton 13.00@16.50
Chalk, in bulk	℔ ton 3.00@ 3.40
China Clay Imported	℔ ton 11.50@18.00
Cobalt, Oxide	℔ 100 lb 1.45@ 2.60
Whiting, Commercial	℔ 100 lb .42@ .52
Gilders	℔ 100 lb .55@ .60
Ex. Gilders	℔ 100 lb .60@ .65

Putty, Commercial—℔ 100 lb

In bladders	$1.70 @1.85
In bbls. or tubs	1.20 @1.45
In 1 lb to 5 lb cans	2.65 @2.95
In 12½ to 50 lb cans	1.50 @1.90

Spirits Turpentine—℔ gal.

In Oil bbls.	.54 @54½
In machine bbls.	.54½@55

Glue—

	℔ lb
Cabinet	.12 @15
Common Bone	.7½@ 9
Extra White	.18 @24
Fish, liquid, 50 gal. bbls., per gallon	.60 @1.20
Foot Stock, White	.12 @14
Foot Stock, Brown	.9 @11
German Common Hide	.10 @12
German Hide	.12 @18
French	.10 @40
Irish	.13 @16
Low Grade	.10 @12
Medium White	.14 @17

Gum Shellac—

	℔ lb
Bleached, Commercial	.23 @24
Bone Dry	.28 @29
Button	.40 @50
Diamond I	.17 @18
Fine Orange	.29 @32
A. C. Garnet	.24 @25
G. A. L.	.20 @22
Kala Button	.17 @18
D. C.	.48 @49
Octagon B	.78 @80
T. N.	.21 @23
V. S. O.	.47 @48

Colors in Oil—

	℔ lb
Black, Lampblack	.12 @14
Blue, Chinese	.36 @46
Blue, Prussian	.32 @36
Blue, Ultramarine	.13 @16
Brown, Vandyke	.11 @14
Green, Chrome	.12 @16
Green, Paris	.. @24
Sienna, Raw	.12 @15
Sienna, Burnt	.12 @15
Umber, Raw	.11 @14
Umber, Burnt	.11 @14

White Lead, Zinc, &c.—

	℔ lb
Lead, English white, in Oil	.10¼@10¾
Lead, American White:	
Lots of 500 lb or over, in Oil	@ 6¾
Lots less than 500 lb, in Oil	@ 7¼
Lead, White, in oil, 25 lb tin pails	@ 7¼
Lead, White, in oil, 12½ lb tin pails	@ 7¾
Lead, White, in oil, 1 to 5 lb assorted tins	@ 8¾

Lead, American. Terms: On lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice.

Zinc, Dry—

	℔ lb
American, dry	5¼@ 5¾
(French process), Red Seal	6¾@ 7
(French process), Green Seal	7¼@ 7½
German (French process), Red Seal	6¾@ 7
Green Seal	7¼@ 7¾
White Seal	7¾@ 8¼
French, Red Seal	8¼@ 8¾
Green Seal	10½@10¾

Dry Colors—

	℔ lb
Black, Carbon	.6¼@10
Black Drop, American	.3½@ 8
Black Drop, English	.5 @15
Black, Ivory	.16 @20
Lamp, commercial	.4 @ 6
Blue, Celestial	.4 @ 6
Blue, Chinese	.31 @33
Blue, Prussian	.29 @31
Blue, Ultramarine	.3½@15
Brown, Spanish	.½@ 1
Carmine, No. 40	$3.10@3.25
Green, Chrome, ordinary	.3½@ 5
Green, Chrome, pure	.17 @25
Lead, Red, bbls., ½ bbls., kegs.	@ 6¾
Litharge, bbls., ½ bbls., kegs.	@ 6¾
Ocher, American	℔ ton $8.50@16.00
American Golden	.2½@ 3¼
French	.1¼@ 2
Foreign Golden	.3 @ 4
Orange Mineral, English	.10 @11
French	.12¾@13
German	.10 @11
American	.8½@ 8¾
Red, Indian, English	.4¼@ 6
American	.3 @ 3¼
Red, Turkey, English	.4 @10
Red, Tuscan, English	.7 @10
Red, Venetian, Amer.	℔ 100 lb $0.50@1.25
English	℔ 100 lb $1.15@1.60
Sienna, Italian, Burnt and Powdered	.3 @ 9
Italian, Raw, Powdered	.3 @ 7
American, Raw	.1¼@ 2
American Burnt and Pow'd.	.1¼@ 2
Tale, French	℔ ton $18.00@25.00
American	℔ ton 15.00@25.00
Terra Alba, French	℔ 100 lb .90@ 1.70
English	℔ 100 lb .80@ 1.00
American	℔ 100 lb, No. 1, .75@ .80
American	℔ 100 lb, No. 2, .60@ .85
Umber, T'key, Bnt. & Pow.	.2¾@ 3
Turkey, Raw and Powdered	.2¾@ 3
Burnt, American	.1¼@ 2
Raw, American	.1¼@ 2
Yellow Chrome, Pure	.13 @15
Vermilion, American Lead	.7 @25
Quicksilver, bulk	.65 @..
Quicksilver, bags	@68
English, Imported	.65 @70
Chinese	$0.90@1.00

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1907, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—"The Iron Age Standard Hardware Lists" contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Columbian and Domestic.....33⅓%
North's 10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition—See *Caps, Cartridges, Shells, &c.*

Anti-Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers, ₱ doz. pairs, Nos. 1, $0.75; 2, $0.60; 4, $1.00; 5, $0.50.
Fernald Quick Shifter, ₱ doz. pairs .....$2.00@$3.00

Anvils—American—

Eagle Anvils.....₱ lb @8½¢
Hay-Budden, Wrought.....9½@9¾¢
Trenton .....₱ lb 9½@9¾¢

Imported—

Swedish Solid Steel Sisco, Superior, ₱ lb.....10@10½¢
Peter Wright & Sons, ₱ lb, 84 to 349 lb. 11¢; 350 to 600 lb, 11¼¢.

Anvil, Vise and Drill—

Millers Falls Co., $18.00.....15&10%

Apple Parers—See *Parers, Apple, &c.*

Aprons, Blacksmiths'—

Livingston Nail Co.....10%

Augers and Bits—

Com. Double Spur....75&10@80%
Jennings' Pat'n., Bright..65&10@70%
Black Lip or Blued...65@65&5%
Boring Mach. Augers.....70%
Car Bits, 12-in. twist.....40&10%
Ford's Auger and Car Bits.....40&5%
Ft. Washington Auger Co., Conard's 35%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list, 25&7½%
No. 30, R. Jennings' list.....50%
Russell Jennings .....25&10&2½%
L'Hommedieu Car Bits.....15%
Mayhew's Countersink Bits.....45%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist.....60%
Snell's King Auger Bits.....50%
Wright's Jennings' Bits.....50%

Bit Stock Drills—

See *Drills, Twist.*

Expansive Bits—

Clark's Pattern, No. 1, ₱ doz. $28; No. 2, $18.....60&10%
Ford's, Clark's Pattern.....66⅔&5%
C. E. Jennings & Co., Steer's Pat..25%
Lavigne Pat., small size, $18.00; large size, $26.00.....60&10%
Swan's 60%

Gimlet Bits—

Per gro.
Common Dble. Cut....$3.00@3.25
German Pattern, Nos. 1 to 10, $4.75; 11 to 13, $5.75

Hollow Augers—

Bonney Pat., per doz..$6.50@7.00
Ames .....25&10%
Universal 20%

Ship Augers and Bits—

Ship Augers.....40&10@—%
Ford's .....33⅓&5%
C. E. Jennings & Co.:
L'Hommedieu's 6%
Watrous' .....33⅓&7½%
Snell's 40%

Awl Hafts—See *Handles, Mechanics' Tool.*

Awls—

Brad Awls:
Handled .....gro. $2.75@3.00
Unhdled, Shldered...gro.63@66¢
Unhandled, Patent..gro.66@70¢
Peg Awls:
Unhandled, Patent..gro. 31@34¢
Unhdled, Shldered..gro. 65@70¢
Scratch Awls:
Handled, Com...gro. $3.50@4.00
Handled, Socket..gro.$11.50@12.00

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—

Single Bit, base weights: Per doz.
First Quality.....$4.75@5.00
Second Quality.....$4.25@4.50
Double Bit, base weights:
First Quality.....$7.00@7.50
Second Quality.....$6.50@6.75

Axle Grease—

See *Grease, Axle*

Axles—Iron or Steel

Concord, Loose Collar..4½@5 ¢
Concord, Solid Collar...4¾@5¼¢
No. 1 Common, Loose....3¾@4¼¢
No. 1½ Com., New Style..4½@5 ¢
No. 2 Solid Collar.....4½@5 ¢
Half Patent:
Nos. 7, 8, 11 and 12..65@65&10%
Nos. 13 to 14.....65@65&10%
Nos. 15 to 18.....70@70&10%
Nos. 19 to 22.....70@70&10%

Boxes, Axle—

Common and Concord, not turned lb., 5@6¢
Common and Concord, turned. lb., 6@7¢
Half Patent.....lb., 9½@10¢

Bait—Fishing—

Hendryx:
A Bait.....20%
B Bait.....25%
Competitor Bait.....20&5%

Balances—Sash—

Caldwell new list.....50%
Pullman .....50&10@60%

Spring—

Spring Balances.....50&10@60%
Chatillon's:
Light Spg. Balances.....50@50&10%
Straight Balances.....40@40&10%
Circular Balances.....50&10%
Large Dial.....30%

Barb Wire—See *Wire, Barb.*

Bars—Crow—

Steel Crowbars, 10 to 40 lb..... per lb., —@2½@2¾¢

Towel

No. 10 Ideal, Nickel Plate..₱ gro. $8.50

Beams, Scale—

Scale Beams.....40%
Chatillon's No. 1.....30%
Chatillon's No. 2.....40%

Beaters, Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered ₱ doz. $0.80; Tinned $0.85
No. 11 Wire Coppered ₱ doz. $1.15; Tinned $1.20
No. 10 Wire Tinned.....₱ doz. $1.50

Beaters, Egg—

Holt-Lyon Co.:
Holt, per doz., No. 5, Jap'd, $0.80; No. A, Jap'd, $1.15; No. B, Jap'd, $1.85; No. 6, Jap'd, $1.65.
Lyon, Jap'd, per doz., No. 2, $1.35.
Taplin Mfg. Co.:
Improved Dover, per gro., No. 60, $6.00; No. 75 $6.50; No. 100, $7.00; No. 102, Tin'd, $8.50; No. 150, Hotel, $15.00; No. 152, Hotel Tin'd, $17.00; No. 200, Tumbler, $8.50; No. 202, Tumbler Tin'd, $9.50; No. 300, Mammoth, per doz., $25.00.
Turner & Seymour Mfg. Co.:
T. & S. Dover.....$6.50

Bellows—

Blacksmith, Standard List..
Split Leather.....60&10@65%
Grain Leather.....50@50&10%

Hand—

Inch..	*6*	*7*	*8*	*9*	*10*
Doz..	*$5.00*	*5.50*	*6.00*	*6.50*	*7.50*

Net Prices.

Molders—

Inch..	*10*	*12*	*14*	*16*
Doz..	*$7.50*	*9.00*	*12.00*	*15.00*

Net Prices.

Bells—Cow—

Ordinary Goods...75&5@75&10&5%
High grade.....70&10@75%
Jersey .....75&10%
Texas Star.....50%

Door—

Home, R. & E. Mfg. Co.'s.....55&10%

Hand—

Polished, Brass.....50&10@60%
White Metal....50&10@50&10&5%
Nickel Plated.....50&5%
Swiss .....50&5%
Cone's Globe Hand Bells.....33⅓@35%

Miscellaneous—

Farm Bells.....lb., 2¼@2½¢
Church and School....60@60&5%

Belting—Leather—

Extra Heavy, Short Lap..60&5%
Regular Short Lap....60&10&5%
Standard .....70&5%
Light Standard.....75%
Cut Leather Lacing.....40&10%
Leather Lacing Sides, per sq. ft. 2½½¢

Rubber—

Agricultural (Low Grade)..... 75@75&5%
Common Standard....70@70&10%
Standard .....70@70&5%
Extra .....60&5@60&10%
High Grade.....50&5@50&10%

Bench Stops—

See *Stops, Bench*

Benders and Upsetters, Tire—

Green River Tire Benders and Upsetters 20%

Bicycle Goods—

John S. Leng's Son & Co.'s 1907 list: Chain, Parts, Spokes.....50%
Tubes 60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks—Tackle—

Common Wooden.....75@75&5%
B. & L. B. Co.:
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50&10%; Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50&10%; Wire Rope Snatch, 50%.
Lane's Patent Automatic Lock and Junior 30%
See also Machines, Hoisting.

Boards, Stove—

Paper and Wood Lined.....55%
Embossed 55%

Boards, Wash—

See *Washboards.*

Bobs, Plumb—

Keuffel & Esser Co.....33⅓%

Bolts—

Carriage, Machine, &c.—

Common Carriage (cut thread):
⅝ × 6 and smaller.....75@—%
Larger and longer.....70@—%
Phila. Eagle, $3.00 list...80@—%
Bolt Ends.....70@—%
Machine (Cut Thread):
⅝ × 4 and smaller...75&5@—%
Larger and longer.....70@—%

Door and Shutter—

Cast Iron Barrel, Japanned, Round Brass Knob:

Inch	*3*	*4*	*5*	*6*	*8*
Per doz	*$0.30*	*.35*	*.45*	*.60*	*.80*

Cast Iron Spring Foot, Jap'd:

Inch	*6*	*8*	*10*
Per doz	*$1.20*	*1.50*	*2.25*

Cast Iron Chain, Flat, Japanned:

Inch	*6*	*8*	*10*
Per doz	*$1.00*	*1.40*	*1.65*

Cast Iron Flat Shutter, Jap'd., Brass Knobs:

Inch	*6*	*8*	*10*
Per doz	*$0.75*	*.95*	*1.25*

Wrought Barrel Japd..80@80&10%
Barrel Bronzed.....60&10%
Spring .....70&10@70&10&5%
Shutter .....50&5@50&10&5%
Square Neck.....75&75&10%
Square .....70&10&10%
Ives' Patent Door.....55%
Ives' Wrought Metal.....45%

Expansion—

Richards Mfg. Co.....50&10%
Steward & Romaine Mfg. Co.
Style No. 13, Double.....55%
Style No. 1, Single.....55%
Style No. 100, Dbl. Jaw, Single..50%
Lag Screw.....66⅔%

Plow and Stove—

Plow .....65&5@70%
Stove .....85@85&5%

Tire—

Common Iron.....80%
Norway Iron.....80%
American Screw Company:
Norway Phila., list Oct. 16, '84..80%
Eagle Phila., list Oct. 16, '84....82½%
Bay State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84..80%
Eagle Phila., list Oct. 16, '84....82½%
Eclipse, list Dec. 28, '99.....80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phila., list Oct., '84 .....80%
Eagle 82½%
Shelton Co.:
Tiger Brand, list Dec. 28, '99.....80%
Phila., Eagle, list Oct. 16, 1884..82½%
Upson Nut Co.:
Tire Bolts.....72½%

Borers, Bung—

Borers Bung, Ring, with Handle:				
Inch.....	*1¼*	*1½*	*1¾*	*2*
Per doz....	*$4.80*	*5.60*	*6.40*	*8.00*
Inch			*2¼*	*2½*
Per doz.....			*$8.65*	*11.50*

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.75; No. 3, $2.50 each.....25%

Boxes, Mitre—

C. E. Jennings & Co.....25%
Langdon, New Langdon and Langdon Improved, 20&10%; Langdon Acme .....15&10%
Perfection 40%
Seavey 45%

Braces—

Common Ball, American....$1.50
Barber's .....50&10&10@60&10%
Fray's Genuine Spofford's.....60%
Fray's No. 70 to 120, 81 to 123, 207 to 414.....60%
C. E. Jennings & Co.....50&5%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Pat...50%
Millers Falls Drill Braces.....25&10%
P., S. & W. Co., Peck's Pat..60&10%

Brackets—

Wrought Steel.....70&10@75&10%
Bradley Metal Clasp..80&10@80&10&5%
Griffin's Pressed Steel.....75@75&10%
Griffin's Folding Brackets.....70&10%
Taplin Victor Handy Egg Beater Bracket .....₱ doz. $1.50

Bright Wire Goods—

See *Wire and Wire Goods.*

Broilers—

Kilbourne Mfg. Co.....75&20%
Wire Goods Co.....75%

Buckets, Galvanized—

M'f'gr's list, price per gross.

	Quart	*10*	*12*	*14*	
Water, Reg.		*25.35*	*28.00*	*32.00*	10&5%*
Water, Hvy.		*45.35*	*48.00*	*52.00*	
Fire, Rd. Btm.		*32.00*	*34.65*	*38.65*	
Well		*37.35*	*41.35*	*45.35*	

Bull Rings—See *Rings, Bull*

Butts—Brass—

Wrought, High List, Oct. 26, '06.55%
Cast Brass, Tiebout's.....40%

Cast Iron—

Fast Joint, Broad....40&10@50%
Fast Joint, Narrow...40&10@50%
Loose Joint.....70&10@75%
Loose Pin.....70&10@75%
Mayer's Hinges.....70@70&5
Parliament Butts.....70@70&5

Wrought Steel—

Bright.
Light Narrow, Light Reversible .....70&5%
Reversible and Broad..70&5%
Loose Joint, Narrow, Light Inside Blind, &c.....70%
Back Flaps, Table Chest..65%
Japanned.
Light Narrow, Loose Pin, 40&5&
Light Narrow, Ball Tip..60%
Broad .....40&5%
Steeple Tipped.....70%
Ball Tipped.....70%

Extra 10%

Cages, Bird—

Hendryx Brass: Series 3000, 5000, 1100, net list; 1200, 15%; 200, 300, 900 ..... 50%
Hendryx Bronze; Series 700, 800..30%
Hendryx Enameled..... 35%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong, per lb., 4¼@4¾¢
Sharp, 1 prong, per lb., 4¾@5¼¢
Burke's, Blunt 4@4¾¢; Sharp, 4½@5¼¢
Lautier, Blunt, 4@4¼¢; Sharp, 4½@4¾¢
Perkins', Blunt, ₩ lb, 3.65¢; Sharp, 4.15¢

Can Openers—

See *Openers, Can.*

Caps, Percussion—

Eley's E. B..... 55@55¢
G. D.....*per M* 34@35¢
F. L.....*per M* 40@42¢
G. E.....*per M* 48@50¢
Musket .....*per M* 62@63¢

Primers—

Berdan Primers, 32 per M..20&5%
Primer Shells and Bullets..15&10%
All other primers per M.$1.52@1.60

Carpet Stretchers—

See *Stretchers, Carpet.*

Cartridges—

Blank Cartridges;
32 C. F., $5.50.....10&5%
38 C. F., $7.00.....10&5%
22 cal. Rim, $1.50.....10&5%
32 cal. Rim, $2.75.....10&5%
B. B. Caps, Con. Ball, Sicyl.$1.90
B. B. Caps, Round Ball....$1.49
Central Fire.....25%
Target and Sporting Rifle..15&5%
*Primed Shells and Bullets.*15&10%
Rim Fire, Sporting.....50%
Rim Fire, Military.....15&5%

Casters—

Bed .....65&10%
Plate .....60&5%
Philadelphia .....70&10%
Acme, Ball Bearing.....35%
Gem (Roller Bearing).....70&10&10&5%
Steel Gem.....20%
Standard Ball Bearing.....45%
Yale (Double Wheel) low list..40&10%

Cattle Leaders—

See *Leaders, Cattle.*

Chain, Proof Coil—

American Coil, Straight Link:

3-16	¼	*5-16*	*7-16*	½	*9-16*
$8.65	*6.05*	*4.90*	*4.25*	*4.15*	*4.10*
⅝	¾	⅞ to 1	1⅛ to 1¼ inch.		
$4.05	*3.95*	*3.90*	*4.00*		

In cask lots, deduct 25¢.
German Coil.....60@60&5%
German Pattern Coil:
6-0 to 1.....70&5@70&10%
2 and 3..60&10&10@60&10&10&5%
4, 5 and 6.....50&10@50&10&5%

Halter—

Halter Chains.....60@60&5%
German Pattern Halter Chains, list July 24, '97.....60&10&5%
Covert Mfg. Co.
Halter .....35&5%

Cow Ties—

See *Halters and Ties.*

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6½—6-3, *Straight, with ring*..$28.00
6½—6-2, *Straight, with ring*..$29.00
6½—8-2, *Straight, with ring*..$32.00
6½—10-2, *Straight, with ring*..$37.00

NOTE.—Add 2c per pair for Hooks Twist Traces; add per pair for Nos. 2 and 3, 2c; No. 1, 3c; No. 0, 4c to price of Straight Link.

Eastern Standard Traces, Wagon Chain, &c..60&10@60&10&5%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron .....60&10%
Brass 60%
Safety and Plumbers' Chain, 60&10%
Gal. Pump Chain....lb., 4½@5%
Bridgeport Chain Co.:
Triumph Halter and Coil..35&2½@40%
Triumph Dog.....50&10@60%
Brown Halter and Coil.....45@50&5%
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stallion 40%
Oneida Community:
American Halter, Dog and Kennel Chains .....35&2½@40%
Niagara Dog Leads and Kennel Chains .....45@50&5%
Wire Goods Co.:
Dog Chain.....70%
Universal Dbl.-Jointed Chain.....50%

Chain and Ribbon, Sash—

Oneida Community:
Steel Chain..... 60%
Pullman:
Bronze Chain, 60%; Steel Chain 60&10%
Sash Chain Attachments, per set..8¢
Aluminoy Sash Ribbon, per 100 ft.....$1.25@$3.00
Sash Ribbon Attachments, per set..8¢

Chalk—(From Jobbers.)

Carpenters' Blue....gro., 50@55¢
Carpenters' Red.....gro., 45@50¢
Carpenters' White...gro., 40@45¢

Checks, Door—

Bardsley's 45%
Pullman, per gro.....$54.00
Russwin 33⅓%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools.....50%
Youths' Chests, with Tools.....25%
Gentlemen's Chests, with Tools..25%
Farmers', Carpenters,' etc., Chests, with Tools.....20%
Machinists and Pipe Fitters' Chests, Empty.....45%
Tool Cabinets.....45%
C. E. Jennings & Co.'s Machinists' Tool Chests.....7½%

Chisels—

Socket Framing and Firmer

Standard List.....80@—%
Buck Bros.....30%
C. E. Jennings & Co.:
Socket Firmer No. 10.....25&7½%
Socket Framing No. 15.....25&7½%
Swan's .....66⅔@70%
L. & I. J. White Co.....30@30&5%

Tanged—

Tanged Firmers.....30&5@35%
Buck Bros.....30%
C. E. Jennings & Co. Nos. 191, 181..25%
L. & I. J. White Co.....25&5%

Cold— lb.

Cold Chisels, good quality..13@15¢
Cold Chisels, fair quality..11@13¢
Cold Chisels, ordinary... 9@10¢

Chucks—

Almond Drill Chucks.....35%
Almond Turret Six-Tool Chuck.....40%
Beach Pat., each $8.00.....35&5%
Empire 25%
Blacksmiths' 25%
Jacobs' Drill Chucks.....35%
Pratt's Positive Drive.....25%
Skinner Patent Chucks:
Independent Lathe Chucks.....35%
Universal, Reversible Jaws.....35%
Combination, Reversible Jaws....35%
Drill Chucks, New Model, 25%; Standard, 45%; Skinner Pat., 25%; Positive Drive.....40%
Planer Chucks.....20%
Face Plate Jaws.....35%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17, 40%; No. 21.....35%
Scroll Combination, Nos. 83 and 84 .....30%
Geared Scroll, Nos. 33, 34 and 35..25%
Independent Iron, Nos. 18 and 318.35%
Independent Steel, No. 64.....25%
Union Drill, Nos. 000, 00, 100, 101, 102, 103, 104.....35%
Union Czar Drill.....25%
Universal, 11, 12, 16, 17, 13, 14, 15..40%
Universal, No. 42.....35%
Iron Face Plate Jaws, Nos. 28, 30, 48 and 50.....35%
Steel Face Plate Jaws, Nos. 70 and 72 .....30%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill..50%
Little Giant Drill, Improved.....50%
Oneida Drill.....50%
Scroll Combination Lathe.....50%
Whitaker Mfg. Co.:
National Drill.....25%

Clamps—

Adjustable, Hammers'.....20@20&5%
Carriage Makers', P., S. & W. Co. .....50&10%
Besly, Parallel.....33⅓&10%
Myers' Hay Rack.....45%
Lineman's Swedish Neverturn.....65%
Wood Workers, Hammers'.....40&10%
Saw Clamps, see Vises, Saw Filers'.

Cleaners, Drain—

Iwan's Champion, Adjustable.....50%
Iwan's Champion, Stationary.....40%

Sidewalk—

Star Socket, All Steel..₩ doz. $4.05 net
Star Shank, All Steel..₩ doz. $3.24 net
W. & C. Shank, All Steel, ₩ doz., 7⅛ in., $3.00; 8 in., $3.25.

Cleavers, Butchers'—

Foster Bros.....30%
Fayette R. Plumb.....30%
L. & I. J. White Co.....30%

Clippers, Horse and Sheep—

Chicago Flexible Shaft Company:
1902 Chicago Horse, each..$10.75
20th Century Horse, each..$5.00
Lightning Belt Horse, each.$15.00
Chicago Belt Horse, each.$20.00
Stewart's Enclosed Gear Horse, each.....$8.75
Stewart's Patent Sheep Shearing Machine, each.....$12.75
Stewart Enclosed Gear Shearing Machine, No. 8, each..$9.75
} 30 & 5

Clips, Axle—

Regular Styles, list July 1, '05, 80&80&10%

Cloth and Netting, Wire

—See *Wire, &c.*

Cocks, Brass—

Hardware list:
Plain Bibbs, Globe, Kerosene, Racking, Liquor, Bottling, &c. .....70@—%
Compression Bibbs..60&10@—%

Coffee Mills—

See *Mills, Coffee.*

Collars, Dog—

Nickel Chain, Walter B. Stevens & Son's list.....40%
Leather, Walter B. Stevens & Son's list 40%

Compasses, Dividers, &c.

Ordinary Goods.....70&10@75%
Wm. Schollhorn Co.:
Excelsior Dividers.....60%
Lodi Dividers.....70&10%

Conductor Pipe,—

	Gal. Steel, L. C. L. to Dealers:	*Charcoal.*
Eastern	....70&10%	50&10&2½%
Pittsburgh	..75&10&5%	60%
Central	....75&10%	6 %
Northwestern,	75&7½%	60%
Western	...70&12½%	50&12½%
Tennessee	..70&10%	50&12½%
Southern	... 70%	50&12½%
Southwestern,	70%	50&5%

Terms, 60 days; 2% cash 10 days. Factory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

L. & G. Mfg. Co.:

Gal.	2	3	4	6	8
Galvanized, ea.	$1.85	$2.00	$2.25	$2.90	$3.90
Galvanized, Lined, side handles, Gal.	2	3	4	6	8
Each	$1.95	$2.15	$2.40	$3.30	$4.15

White Enameled.....10%
Agate Lined.....10%

Coopers' Tools—

See *Tools, Coopers'.*

Coppers' Soldering—

Soldering Coppers, 3 lbs. to pair and heavier, 22@25¢; lighter than 3 lb. to pair.....24@27¢

Cord— Sash—

Braided, Drab.....lb. 35¢
Braided, White, Com., Nos. 8 to 12, 23¢; No. 7, 23½¢; No. 6, 24½¢. In lots of 12 doz. or over, 1 cent less per pound.
Cable Laid Italian, lb., No. 18..37¢
Italian, lb., A, No. 18, 25¢; B, 22¢
Common India.....lb., 11@11½¢
*Cotton Sash Cord, Tw'ted.*18@20¢
Patent Russia.....lb...20¢
Cable Laid Russia.....lb...21¢
India Hemp, Br'd'd.....lb...21¢
India Hemp, Twisted..lb.13@14¢
Patent India, Twisted...lb...17¢
Pearl Braided, cotton, No. 6, ₩ lb., 27½¢; No. 7, 26½¢; Nos. 8 to 12, 26¢
Eddystone, Braided, Nos. 8 to 12, 26¢; 7, 26½¢; 6, 27½¢.
Harmony Cable Laid Italian, Nos. 7 to 10.....₩ lb 23 ¢
Pullman:
Wire Sash Cord.....10%
Sash Cord Attachments, per doz.10¢
Samson, Nos. 8 to 12:
Braided, ₩ lb., Drab Cotton, 55¢; Italian Hemp, 40¢@50¢; Linen, 65¢; White Cotton, 50¢; Spot Cord.....50¢
Massachusetts, White....₩ lb 40¢
Massachusetts, Drab.....₩ lb 45¢
Phoenix, White, Nos. 8 to 12, 27¢;
} 15%
Silver Lake, per lb.:
A, Drab, 45¢; A, White, 40¢; B, Drab, 40¢; B, White, 35¢; Italian Hemp, 40¢; Linen....57½¢
See also Chain and Ribbon.

Wire, Picture—

List July 10, 1906.....90@—%
Hendryx Standard Wire Picture Cord, old list, 85&10%
Turner & Stanton Co. Wire Picture Cord .....85&10%

Cradles—

Grain .....40&12½%

Crayons—

White Round Crayons, Cases, 100 gro., $6.50@$7.50 at factory, but lower prices made by jobbers
Zelnicker's Lumber.....₩ gro. White and Purple, Indelible....$7.50
Blue, Red, Green, Yellow and Terra Cotta, $6.50; Black.....$4.50
Giant Lumber, 5¼ in. x 15-16 in. round, all colors, $12.00; Indelibles, $14.00; Blacks.....$10.00
Genuine Soapstone, Metal Workers', 5 in. x ¼ in. Round, $2.50; 5 in. x ¼ in. Square, $1.75; 5 x ½ x 3-16, $2.50; 5 x 1¼ x 3-16.....$3.00

Crooks, Shepherds'—

Fort Madison, per doz., Heavy, $5.50; Light $5.00

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden.....50%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847, ₩ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor .....₩ doz. $3.00
Wm. Rogers & Son.....₩ doz. $2.50

Cutters— Glass—

H. H. Mayhew Co.....40%
Red Devil.....60%
B. Mfg. Co.....40%
Woodward 50%

Meat and Food—

American 30%

Nos.	401	402	403	404	405	406	407
Each	$5	$7	$10	$12	$25	$50	$60

Enterprise:

Nos.	5	10	12	22	32
Each	$2	$3	$2.75	$4.50	$6

No. 202, $1.50.....40&7½%
P., S. & W. Co.:
Dixon's .....₩ doz. 33⅓%

Nos.	1	2	3	4
	$14.00	$17.00	$19.00	$30.00

Ideal .....40@40&5%
Hales .....60&10&5%
Little Giant.....₩ doz. 40@50%

Nos.	305	310	312	320	322
	$35.00	$48.00	$44.00	$72.00	$68.00

New Triumph No. 605, ₩ doz, $24.00, 40&10%
Russwin Food. No. 1, $24.00; No. 2, $27.00 .....45&10&10%

	$15.00	$18.00

Enterprise Beef Shavers.....25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw and Kraut Cutters.....35%
Corn Graters.....30%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....₩ doz. $3.00
Combined Slaw Cutter and Corn Grater .....₩ doz. $4.00

Tobacco—

All Iron, Cheap..*doz.* $1.25@$4.50
Enterprise .....25@30%
National, ₩ doz., No. 1, $21; No. 2, $18 .....40%

Diggers, Post Hole, &c.—

Disston's:
Rapid, ₩ doz., $24.00.....25%
Samson, ₩ doz., $34.00.....25%
Iwan's Imp'ved Post Hole Auger..40%
Vaughan Pattern Post Hole Augers, ₩ doz., $7.00
Perfection Post Hole Diggers, ₩ doz. $8.75
Split Handle Post Hole Diggers, ₩ doz., $7.75
Hercules Pattern, ₩ doz.....$10.00
Kohler's, ₩ doz., Universal, $15.00; Little Giant, $12.00; Hercules, $10.00; Invincible, $9.00; Rival, $8.50; Pioneer.....$7.50
Never-Break Post Hole Diggers, ₩ doz., $24.00.....60%

Dividers—See *Compasses.*

Drawing Knives—

See *Knives, Drawing.*

Dressers, Emery Wheel—

Sterling Emery Wheel Dressers.....35%
Sterling Wheel Dresser Cutters.....35%

Drills and Drill Stocks—

Blacksmiths' Common Drilling Machines .....$1.50@$1.75
Breast, Millers Falls.....15&10%
Breast, P., S. & W.....33⅓%
Goodell Automatic Drills.50&10@60&10%
Millers Falls Automatic Drills.33⅓&10%
Ratchet, Curtis & Curtis.....25%
Ratchet, Parker's.....40%
Ratchet, Weston's.....40%
Ratchet, Weston's, Style H Improved 40%
Ratchet, No. 912.....40%
Ratchet, Celebrated.....40%
Ratchet, Whitney's, P., S. & W. 50&5%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00.....33⅓%

Twist Drills—

Bit Stock.....70@70&5%
Taper and Straight Shank 60&10@70%

Drivers, Screw—

Screw D'ver Bits, per doz..45@50¢
Baisey's Screw Holder and Driver, ₩ doz., 2½-in., $6; 4-in., $7.50; 6-in., ₩ 50%
Buck Bros.' Screw Driver Bits.....30%
Champion 50%
Disston's 70%
Fray's Hol. H'dle Sets, No. 3, $12..50%
Ford's Brace Screw Drivers...40&10%
Gay's Double Action Ratchet.....35%
Goodell's Auto.....65@65&10%
Mayhew's Black Handle.....40%
Mayhew's Monarch.....40%
Millers Falls, Nos. 20 and 21...25&10%
Millers Falls, Nos. 11, 12, 41, 42..15&10%
Smith & Hemenway Co., Neverturn, 66⅔%; Elmora, 60%; Star, 30&10%
Swan's:
Nos. 7565 to 7568, 50%; No. 7540, 40&10%

Eave Trough, Galvanized—

Territory.	*Gal. Steel.*	*Charcoal Iron.*
Eastern	....75&10&5%	60&20%
Pittsburgh	.80&20%	65&10%
Central	...80&10&10&2½%	65&10%
Northwestern	80&10&10%	65&10%
Western	....80&10%	60&10&5%
Tennessee	..80&5%	60&10&5%
Southern	.. 80%	60&10&5%
Southwestern	75&10&2½%	60&5%

Terms.—2% for cash. Factory shipments generally delivered.
Note.—Lower prices are made in some sections.
See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments, all territories:
Galv. Steel and Galv. Iron, Standard Gauge....85@85&10%
No. 26.....50%
No. 24.....85%
No. 22.....10%
Copper .....50&10%

Elbows, Stove Pipe—

Edwards, Standard Blue.....40&10&10%
Edwards, Royal Blue.....40&10&10%
Reeves, Dover, one piece.....40&10%

Emery, Turkish—

	¼ to ½:	*½ to 220: Flour.*
Kegs .....lb.	5 ¢	5½¢ 5½¢
½ Kegs.....lb.	5½¢	5¾¢ 5¾¢
¼ Kegs.....lb.	5½¢	6 ¢ 6 ¢
10-lb. cans, 10 in case....6½¢		7 ¢ 6 ¢
10-lb. cans, less than 10.....	10 ¢	10 ¢ 8 ¢
Less quantity..	10 ¢	10 ¢ 8 ¢

NOTE.—In lots 1 to 2 tons a discount of 10% is given.

Extractors, Lemon Juice

—See *Squeezers, Lemon.*

Fasteners, Blind—
Zimmerman's ..... 50&10%
Walling's ..... 40&10%
Upson's Patent 40%

Cord and Weight—
Ives and Titan 33⅓%

Corrugated—
Acme Corrugated Fasteners 70%

Faucets—
Cork Lined ..... 50&10@60%
Metallic Key, Leather Lined, 50&10@70%
Red Cedar ..... 40&5@40&10&5%
Petroleum ..... 70&10@75%
B. & L. B. Co.:
Metal Key ..... 60&10%
Star 60
West Lock ..... 50&10%
John Sommer's Peerless Tin Key 40%
John Sommer's Boss Tin Key 50%
John Sommer's Victor Mtl. Key .50&10%
John Sommer's Duplex Metal Key .. 60%
John Sommer's Diamond Lock 40%
John Sommer's I. X. L. Cork Lined ... 50%
John Sommer's Reliable Cork Lined ... 50&10%
John Sommer's Chicago Cork Lined. 60%
John Sommer's O. K. Cork Lined ... 50%
John Sommer's No Brand, Cedar 50%
John Sommer's Perfection, Cedar 40%
Self Measuring:
Enterprise, ₱ doz. $36.00 ..... 40&10%
Lane's, ₱ doz. $36.00 ..... 40&10%
National Measuring, ₱ doz. $36. 40&10%

Felloe Plates—
See *Plates, Felloe.*

Files— Domestic—
List Nov. 1, 1899.
Best Brands ..... 70&10@75&10%
Standard Brands ..... 75&10@80%
Lower Grade ... 75&10&10@80&10%

Imported—
Stubs' Tapers, Stubs' list, July 24, '97 ..... 33 1-3@40%

Fixtures, Fire Door—
Allith Underwriters' Approved 50%
Richards Mfg. Co.:
Universal, No. 103; Special, No. 104 ..... $3.75
Fusible Links, No. 96 ..... 60%
Expansion Bolts, No. 107 ..... 60&10%

Grindstone—
Net Prices:

Inch	*15*	*17*	*19*	*21*
Per doz.	*$3.60*	*3.85*	*4.15*	*4.65*

P., S. & W. Co. 25%
Reading Hardware Co. 60%

Fodder Squeezers—
See *Compressors.*

Forks—
NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Iowa Dig-Ezy Potato ..... 60&10%
Victor, Hay ..... 60&15&2½%
Victor, Manure 60%
Victor, Header 60
Champion, Hay 60%
Champion, Header 60
Champion, Manure ..... 60&15&2½%
Columbia, Hay ..... 60&20%
Columbia, Manure ..... 60&20%
Columbia, Spading ..... 70&12½%
Hawkeye Wood Barley 40%
W. & C. Potato Digger ..... 60&10%
Acme Hay ..... 60&20%
Acme Manure, 4 tine ..... 60&10&5%
Dakota Header ..... 60&20%
Jackson Steel Barley ..... 60&20%
Kansas Header 65%
W. & C. Favorite Wood Barley 40%
Plated.—See Spoons.

Frames— Wood Saw—
White, S'g't Bar, per doz. 75@80¢
Red, S'g't Bar, per doz. $1.00@1.25
Red, Dbl. Brace, per doz. $1.40@1.50

Freezers, Ice Cream—

Qt.	*1*	*2*	*3*	*4*	*6*
Each	*$1.25*	*$1.60*	*$1.90*	*$2.20*	*$2.80*

Fruit and Jelly Presses—
See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse— *Per 1000 Feet.*
Hemp *$2.75*
Cotton *3.20*
Waterproof Sgl. Taped .. *3.65*
Waterproof Dbl Taped .. *4.40*
Waterproof Tpl. Taped .. *5.15*
} 10&12½%

Gates, Molasses and Oil—
Stebbins' Pattern ..... 80@80&5%

Gauges—
Marking, Mortise, &c. 50@50&10%
Chapin-Stephens Co.:
Marking, Mortise, &c. ..... 50&50&10%
Disston's Marking, Mortise, &c. .67½%
Wire, Brown & Sharpe's 33⅓%
Wire, Morse's 25%
Wire, P., S. & W. Co. 33⅓%

Gimlets— Single Cut—
Numbered assortments, per gro.
Nail, Metal, No. 1, $2.00; 2, $2.50
Spike, Metal, No. 1, $4.00; 2, $4.50
Nail, Wood Handled, No. 1, $2.50; 2, $2.80
Spike, Wood Handled, No. 1, $4.50; 2, $4.60

Glass, American Window
See *Trade Report.*

Glasses, Level—
Chapin-Stephens Co. ..... 65@65&10%

Glue, Liquid Fish—
Bottles or Cans, with Brush ..... 25&10@50%
Elwell's 40%

Grease, Axle—
Common Grade .... *gro. $6.00@6.50*
Dixon's Everlasting, 10-lb pails, ea. 85¢; in boxes, ₱ doz., 1 lb. $1.20; 2 lb. $2.00
Helmet Hard Oil 25%

Griddles, Soapstone—
Pike Mfg. Co. ..... 33⅓@33⅓&10%

Grinders—
Royal Mfg. Co.:
Alundum Grinding Machines, each, Nos. 01, $1.75; 1A, $2.50; 10, $5.00 ..... 30%
Alundum Sickle Grinders, each, Nos. 20, $5.00; 20A, $6.00; 20A Combined, $6.50 ..... 30%
Alundum Disc Grinders, each, $2.50 ..... 30%

Grindstones—
Pike Mfg. Co.:
Improved Family Grindstones, ₱ inch, ₱ doz., $2.00 ..... 33⅓%
Richards Mfg. Co., Eli and Cycle, Ball Bearing, mounted 40%

Grips, Nipple—
Perfect Nipple Grips ..... 40&10&2%

Halters and Ties—
Cow Ties ..... *60&5@60&10%*
Bridgeport Chain Co.:
Triumph Coil and Halters. 35&2½@0%
Brown Coil and Halters ... 45@40&5%
Brown Cow Ties ..... 50&5@50&10&5%
Brown Tie Outs ..... 70&10@75&5%
Covert Mfg. Co.:
Web ..... 30&2%
Jute Rope 35
Sisal Rope 20%
Cotton Rope 45%
Hemp Rope 45%
Oneida Community:
Am. Coil and Halters ..... 40@40&5%
Am. Cow Ties ..... 45@50%
Niagara Coil and Halters. 45@50&5%
Niagara Cow Ties .... 45&5@50&10&5%

Hammers—
Handled Hammers—
Heller's Machinists' ... 55&10@55&10&5%
Heller's Farriers' ..... 40&5@40&10&5%
Peck, Stow & Wilcox Co.:
Crucible Steel 50%
Farriers' ..... 40&10&5%
Riveting 50%
Machinists', revised list ..... 66⅔&5%
Blacksmiths ..... 50&5%
Fayette R. Plumb:
A., E. Nail ..... 40&2½@40&12½%
Eng. and B. S. Hand. 50&10&5@60&5%
Machinists' Hammers ..... 60@60&10%
Rivet and Tinners'. 40&7½@40&12½&5%

Heavy Hammers and Sledges—
Under 3 lb., per lb., 50¢ ... 80&10%
3 to 5 lb., per lb., 40¢ ..... 80&10%
Over 5 lb., per lb., 30¢ .....
Over 5 lb., per lb., 30¢ . 80&10&10%

Handles—
Agricultural Tool Handles
Axe, Pick, &c. .... 60&10@60&10&5%
Hoe, Rake, &c. 40%
Fork, Shovel, Spade, &c.:
Long Handles 40%
D Handles 40%

Cross-Cut Saw Handles—
Atkins 40%
Champion 50%
Disston's 50%

Mechanics' Tool Handles—
Auger, assorted ... gro. $3.00@$3.50
Brad Awl ..... gro. $1.65@$1.75
Chisel Handles, Ass'd, per gro.:
Tanged Firmer, Apple, $2.40@$2.65; Hickory ..... $2.15@2.40
Socket Firming, Apple, $1.75@$1.95; Hickory .... $1.60@$1.75
Socket Framing, Hickory, $1.60@$1.75
File, assorted ..... gro. $1.30@$1.40
Hammer, Hatchet, &c. 60&10@60&10&5%
Hand Saw, Varnished, doz. 80&85¢; Not Varnished ... 65@75¢
Plane Handles:
Jack, doz. 30¢; Jack, Bolted. 75¢
Fore, doz. 45¢; Fore, Bolted. 90¢
Chapin-Stephens Co.:
Carving Tool ..... 30@30&10%
Chisel ..... 60@60&10%
File and Awl ..... 60@60&10%
Saw and Plane ..... 30@30&10%
Screw Driver ..... 30@30&10%
Millers Falls Adj. and Ratchet Auger Handles ..... 15&10%
Nicholson Simplicity File Handle ..... ₱ gro. $0.85@$1.50
J. L. Osgood:
Indestructible File and Tool, ₱ gro., No. 1, $8.00; No. 2, $8.50; No. 3, $9.00; No. 4, $9.50; No. 5, $10.00 ..... gro. lots 10%
W. A. Zelnicker Supply Co.:
Hammer, ₱ doz., 12 in., $2.00; 14 in., $2.00; 16 in., $2.30; 18 in., $2.50; 20 in., $2.70; 22 in., $3.00; 24 in., $3.30; 26 in., $3.50; 30 in., $3.80.
Sledge, ₱ doz., oval, 30 in., $3.80; octagon, 30 in., $3.80; oval, 36 in., $4.00; octagon, 36 in., $4.00.
Axe ₱ doz., 28 to 34 in., $5.60; 36 in., $5.80.
Adze, ₱ doz., 36 in., $5.80; 36 in., $7.80.
Pick, ₱ doz., R. R., 36 in., $8.00; coal, 34 in., $5.80.
Hatchet, ₱ doz., 12 to 14 in., $2.00.
} 60%

Hangers—
NOTE.—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c.
Allith Mfg. Co.:
Reliable, Nos. 1 and 2; Allith, No. 3; Allith Adjustable, No. 6; Reliable Parlor Door 50%
Chicago Spring Butt Co.:
Friction 25%
Oscillating 25%
Big Twin 25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door 50%
Elevator 30%
Railroad 50%
Cronk & Carrier Mfg. Co.:
Loose Axle ..... 60&2½%
Roller Bearing ..... 70&2½%
Griffin Mfg. Co.:
Solid Axle, No. 10, $12.00 .. 60&10%
Roller Bearing, No. 11, $15.00, 60&10%
Roller Bearing, Ex. Hy. No. 22, $18.00 ..... 60&10%
Bull Dog, $24.00 ..... 70%
Lane Bros. Co.:
Parlor, Ball Bearing, $1.00; Standard, $3.15; No. 105, $2.85; New Model, $2.80; New Champion $2.25
Barn Door, Standard ..... 60&10%
Hinged ..... net $6.08
Covered ..... 60&5%
Special ..... 70&5%
Lawrence Bros.:
Advance ..... 55&10%
Cleveland ..... 70&7½%
Clipper, No. 75 ..... 60%
Crown ..... 55&10%
Cyclone, No. 40 ..... net $6.50
Tandem, No. 50 ..... net $7.50
New York ..... 55&10%
McKinney Mfg. Co.:
Roller Bearing, Nos. 1 and 2. 70%
Anti-Friction 60%
Hinged Hangers, King Charm. 60%
Richards Mfg. Co.:
Hangers, Nos. 47, 48, 147, 247, 60&5%
Pioneer Wood Track, No. 3. $2.25
Roller B'r'g St'l Track No. 12. $2.20
Roller B'r'g St'l Track No. 13. $2.50
Roller B'r'g, Nos. 39, 41, 43, 70&7½%
Hero, Adj. Track No. 19. .50&10%
Adjustable Track Tandem Trolley Track No. 16 ..... 50&10%
Seal, Steel Track No. 8 ..... $2.25
Auto Adj. Track No. 22.—50&5%
Trolley B. D. No. 17, $1.25; F. D., No. 120, $2.25; No. 121, $2.45; No. 150 ..... $2.50
Safety Underwriters F. D., No. 101 ..... 50%
Tandem No. 41, 2½ and 3 60&10%
Place. Adjustable Track No. 132 ..... 50&5%
Royal, Adjustable Track No. 122 ..... 50&10%
Ives' Wood Track No. 1 ..... $2.25
Trolley B. D. No. 20 ..... 50&10%
Trolley B. D. No. 24, $1.30; No. 27, $1.40; No. 28 ..... $1.60
Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2. 70&7½%
Anti-friction, No. 42; No. 44, sizes 2½ and 3 ..... 60%
Hinged Tandem No. 48 .... 60&5%
Folding Door B. B. Swivel No. 135 ..... 40%
Taylor & Boggis F'y Co.'s Kidder's Roller Bearing. 50&15&10&5%
Myers' Stayon Hangers 60%
} Extra 10&10% often given.

Hangers— Garment—
Pullman Trouser, ₱ gro., 1 pair Flat Aluminoy, $9.00; 1 pair Round Nickeled, $9.00; 4 pair Round Nickeled, $27.00; 1 pair Flat Gun Metal, $12.00; 1 pair Flat Black Enameled, $7.50; 1 pair Wood Clamp, $13.50; Skirt Hangers, Folding, per gro., $21.00; Coat Hangers, Folding, per gro., $8.00; Garment Hanger Rods, Round Nickeled, per gro., $10.50; Garment Hanger Loops, Round Nickeled, per gro. $10.50
Victor Folding ..... ₱ gro. $9.60

Gate—
Myers' Patent Gate Hangers, ₱ doz. net $4.50

Joist and Timber—
Lane Bros. Co. 30%

Hasps—
Griffin's Security Hasp ..... 50&10%
McKinney's Perfect Hasp, ₱ doz. .60%

Hatchets—
Regular list, first qual. 40&2½@—
Second quality ..... 50&5@—

Heaters, Carriage—
Clark, No. 5, $1.75; No. 5B, $2.00; No. 3, $2.25; No. 3D, $2.75; No. 7D, $3.00; No. 3E, $3.25; No. 1, $3.50 ..... 25%
Clark Coal, ₱ doz., $0.75 ..... 20%

Hinges—
Blind and Shutter Hinges
Surface Gravity Locking Blind: (Victor; National; 1868 O. P.; Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No.	*1*	*3*	*5*
Doz. pair	*$0.75*	*1.35*	*2.70*

Mortise Shutter: (L. & P., O. S., Acme, &c.)

No.	*1*	*1½*	*2*	*2½*
Doz. pair	*$0.70*	*.65*	*.60*	*.55*

Mortise Reversible Shutter (Buffalo, &c.):

No.	*1*	*1½*	*2*
Doz. pair	*$0.70*	*.65*	*.60*

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50 ..... 10%
Charles Parker Co. ..... 70@75%
Parker Wire Goods Co.:
Hale & Benjamin Automatic Blind Hinges 20%
Hale's Blind Awning Hinges, No. 110, for wood, $9.00; No. 111, for brick, $9.00 ..... 20%
Reading's Gravity 60%
Stanley's Steel Gravity Blind Hinges, No. 1647½, ₱ doz. sets, without screws, $0.95; with screws, $1.25.
Wrightsville Hardware Co.:
O. S., Lull & Porter ..... 75&5%
Acme, Lull & Porter 75%
Queen City Reversible 75%
Shepard's Noiseless, Nos. 60, 65, 55 ..... 75&5%
Niagara, Gravity Locking, Nos. 1, 3 & 5 ..... 75&5%
Tip Pat'n, No. 1 ..... 75&10%
No. 3 ..... 75&5%
Buffalo Gravity Locking, Nos. 1, 3 & 5 ..... 70&10&5%
Shepard's Double Locking 75%
Champion Gravity Locking ..... 75&5%
Pioneer ..... 75&10%
Empire 65%
W. H. Co.'s Mortise Gravity Locking, No. 2 ..... 60&10%

Gate Hinges—
Clark's or Shepard's—Doz. sets:

No.	*1*	*2*	*3*
Hinges with L't'chs.	*$2.00*	*2.70*	*5.00*
Hinges only	*1.40*	*2.05*	*3.80*
Latches only	*.70*	*.70*	*.35*

New England:
With Latch ..... doz. ... @$2.00
Without Latch ... doz. ... @$1.60
Reversible Self-Closing:
With Latch ..... doz. ... @$1.75
Without Latch ... doz. ... @$1.35
Western:
With Latch ..... doz. $1.75
Without Latch ..... doz. $1.15
Wrightsville Hardware Co.:
Shepard's or Clark's Hinges and Latches, Hinges only or Latches only, Nos. 1, 2 or 3 ..... 70%

Pivot Hinges—
Bommer Bros. Pivot 40%
Lawson Mfg. Co. Matchless 50%

Spring Hinges—
Holdback, Cast Iron ... $6.75@$7.00
Non-Holdback, Cast Iron $6.50@$6.75
J. Bardsley:
Bardsley's Non-Checking Mortise Floor Hinges 40%
Bardsley's Patent Checking. 33⅓%
Bommer Bros.:
Bommer Ball Bearing Floor. 40%
Bommer Spring Hinges 40%
No. 999 Wrot. Steel Hold Back, ₱ gr. $9.00
Chicago Spring Butt Co.:
Chicago Spring Hinges 25%
Triple End Spring Hinges 50%
Chicago (Ball Bearing) Floor. 50%
Garden City Engine House 25%
Keene's Saloon Door 25%
Columbian Hardware Co.:
Acme, Wrought Steel 30%
Acme, Brass 25%
American 30%
Columbia, ₱ gr., No. 14, $9.00; No. 18, $25.00
Columbia, Adj., No. 7, ₱ gr. $12.00
Columbian Hinges ..... 60&10%
Gem, new list 30%
Clover Leaf ..... ₱ gr. $12.00
Oxford, new list 30%
Floor Spring Hinges ..... 65&10%
Lawson Mfg. Co., Matchless 30%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges 40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door ..... ₱ gr. $9.00
Chief Ball Bearing Floor Hinge 50%
Ball Bearing Door 25%
No. 777, Sheet Steel Holdb'k, ₱ gr. pr. $9.00
Superior Spring Hinge Co.:
Superior Floor Hinges 33⅓%
} Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—
Strap and T Hinges, &c., list December 20, 1904:
Light Strap Hinges .. 50&10%
Heavy Strap Hinges .. 60&5%
Light T Hinges 50%
Heavy T Hinges 40%
Extra Hvy. T Hinges. 50&10%
Hinge Hasps 33⅓%
Cor. Heavy Strap ... 60&5%
Cor. Ex. Heavy T ... 50&10%
} Extra 10&7½%.

Screw Hook and strap.
6 to 12 in. .. *lb. 3½¢*
14 to 20 in. .. *lb. 3¼¢*
22 to 36 in. .. *lb. 3 ¢*

Screw Hook and Eye:
¾ to 1 inch ..... *lb. 6½¢*
⅝ inch ..... *lb. 7½¢*
½ inch ..... *lb. 8½¢*
} 10&5%

Hitchers, Stall—
Covert Mfg. Co., Stall Hitchers. 30&2%

Hods— Coal—
M'f'gr's list, price per gross.

Inch	*15*	*16*	*17*	*18*
Galv. Open	*$35*	*$39*	*$42*	*$46*
Jap. Open	*26*	*28*	*31*	*35*
Galv. Funnel	*48*	*48*	*52*	*56*
Jap. Funnel	*33*	*36*	*39*	*43*

} 10&5%

Masons' Etc.
Cleveland Wire Spring Co.:
Steel Brick, No. 162 ..... each $1.05
Steel Mortar, No. 158 ..... each $1.35

Hoes— Eye—
Scovil and Oval Pattern ..... 60&10@60&10&10%
Grub, list Feb. 28 1900 ..... 70&10@70&10&10%

D. & H. Scovil.....27½%
Am. Fork & Hoe Co. (Scovil Pattern).....60%

Handled—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Cronk's Weeding, No. 1, $2.00; No. 2, $2.50
Star Double Bit.....$3.20
Ft. Madison Cotton Hoe....10&10&10%
Ft. Madison Crescent Cultivator Hoe, ₩ doz.....70&10%
Ft. Madison Mattock Hoes:
Regular Weight.....₩ doz. 40&5%
Junior Size.....₩ doz. $4.00
Ft. Madison Sprouting Hoe, ₩ doz. 60&10%
Ft. Madison Dixie Tobacco Hoe.....75&10&7½%
Kretsinger's Cut Easy.....70&10%
Warren Hoe.....45&10%
W. & C. Ivanhoe.....75&2%
B. B. 6 in., Cultivator Hoe.....$3.40
B. B., 6½ in.....$3.50
Acme Wedding.....₩ doz., net, $4.35
W. & C. L'tning Shuffle Hoe, ₩ doz. $5.25

Hoisting Apparatus—

See *Machines, Hoisting.*

Holders— Bit—

Angular, ₩ doz. $24.00.....45&10%

Door—

Bardsley's, Iron, 40%; Brass and Bronze.....25%
Empire.....50%
Pullman.....35%
Richards Mfg. Co.: No. 117, Ever-ready, 40%; Nos. 118, 119, Sure Grip.....50%
Superior.....33⅓%

File and Tool—

Nicholson File Holders and File Handles.....33⅓@40%

Fruit Jar—

Triumph Fruit Jar Holder, ₩ gross, $10.80; ₩ doz.....$1.25

Trace and Rein—

Fernald Double Trace Holder, ₩ doz. pairs.....$1.25
Dash Rein Holder, ₩ doz. pairs..$1.25

Hones—Razor—

Pike Mfg. Co., Belgian and Swaty, 50%; German.....33⅓%

Hooks—Cast Iron—

Bird Cage, Reading.....40%
Clothes Line, Reading List.....40%
Coat and Hat, Reading.....45&20%
Coat and Hat, Wrightsville.....60&5%
Harness, Reading List.....40%

Wire—

Belt.....80%
Wire C. & H. Hooks....75@—%
Bradley Metal Clasp Wire, Coat and Hat, 70&10%; Ceiling.....70&10%
Columbian Hdw. Co., Gem.....70&5%
Parker Wire Goods Co., King..70&10%
Wire Goods Co.:
Acme, 60&10%; Chief, 70%; Crown, 75%; Czar, 65%; V Brace, 75%; Czar Harness, 50&10%.

Wrought Iron—

Box, 6 in., per doz., $1.00; 8 in., $1.25; 10 in., $2.50.
Cotton.....*doz. $1.05@$1.25*
Wrought Staples, Hooks, &c.—
See Wrought Goods

Miscellaneous—

Hooks, Bench, see *Stops, Bench.*
Bush, Light, doz., $6.20; Medium, $6.75; Heavy, $7.65
Grass, best, all sizes, per doz. $3.00
Grass, common grades, all sizes, per doz.....*$1.50*
Whiffletree.....*lb. 5¾@6¢*
Hooks and Eyes:
Brass.....60@60&10%
Malleable Iron.....70@70&10%
Coverdale Mfg. Co. Gate and Scuttle Hooks.....40%
Ft. Madison Cut-Easy Corn Hooks, ₩ doz. $3.25 net
Turner & Stanton Co. Cup and Shoulder.....80&10%
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—

See *Nails, Horse.*

Horseshoes—

See *Shoes, Horses.*

Hose, Rubber—

Garden Hose, ¾-inch:
Competition.....*ft. 5@ 6¢*
3 ply Guaranteed.....*ft. 8@ 9¢*
4-ply Guaranteed.....*ft. 10@11¢*
Cotton Garden, ¾-in., coupled:
Low Grade.....*ft. 8@ 9¢*
Fair Quality.....*ft. 10@11¢*

Irons— Sad—

From ¼ to 10.....*lb. 3@3¼¢*
B. B. Sad Irons.....*lb. 3¼@3½¢*
Mrs. Potts', cents per set:

Nos.	50	55	60	65
Jap'd Tops	85	80	93	91
Tin'd Tops	88	85	98	95

New England Pressing..lb. 3¾@4¢

Bar and Corner—

Richards Mfg. Co., Bar, 60&10%; Corner.....60%

Pinking—

Pinking Irons.....*doz. 80¢*

Irons, Soldering

See *Copp.ers.*

Jacks, Wagon—

Covert Mfg. Co.:
Auto Screw.....30&2%; Steel, 45%
Lockport.....50%
Lane's Steel.....30&5%
Richards' Tiger Steel, No. 130...50&10%
Smith & Hemenway Co.'s.....25%

Ladder—

Richards Mfg. Co., Ladder Jacks..50%

Kettles—

Brass, Spun, Plain.....*20@25%*
Enameled and Cast Iron—See Ware, Hollow.

Knives—
Butcher, Kitchen, &c.—

Foster Bros.' Butcher, &c.....30%
Wilkinson Shear & Cutlery Co.....60%

Corn—

Columbian Cutlery Co., Wilcut Brand Knives and Hooks.....60%
Wilmington Acme, ₩ doz., $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—

Standard List.....*80@—%*
C. E. Jennings & Co., Nos. 40, 46, 25&7½%
Jennings & Griffin, Nos. 41, 42, 66⅔&7½%
Swan's.....66⅔@70%
Watrous.....16⅔%
L. & I. J. White.....20&5@25%

Hay and Straw—

Serrated Edge, per doz. $5.50@5.75
Iwan's Sickle Edge.....₩ doz. $9.50
Iwan's Serrated.....₩ doz. $10.00

Miscellaneous—

Farriers'.....*doz. $3.00@3.25*
Wostenholm's.....₩ doz. $3.00@3.25

Knobs—

Base, 2½-inch, Birch, or Maple, Rubber Tip.....*gro. $1.25@$1.40*
Carriage, Jap., all sizes.....*gro. 40@45¢*
Door, Mineral.....*doz. 65@70¢*
Door, Por. Jap'd.....*doz. 70@75¢*
Door, Por. Nickel..doz. $2.05@2.15
Bardsley's Wood Door, Shutters, &c.15%

Lacing, Leather—

See *Belting, Leather—*

Ladders, Store, &c.—

Allith Mfg. Co., Reliable.....50%
Lane's Store.....25%
Myers' Noiseless Store Ladders....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50%
Climax Shelf, No. 113.....50%
Trolley, No. 109.....50%

Ladles, Melting—

L. & G. Mfg. Co. (low list).....20%
P. S. & W.....40&10%
Reading.....60%

Lanterns—Tubular—

Regular, No. 0.....*doz. $4.35@4.50*
Side Lift, No. 0.....*doz. $4.60@4.75*
Hinge Globe, No. 0. doz. $4.60@4.75
Other Styles.....*40@40&10%*

Bull's Eye Police—

3-inch.....*$4.25@4.50*

Latches— Thumb—

Roggin's Latches, with screw..doz. 35@40¢

Door—

Allith Mfg. Co., Reliable and Alligator, 50%; Reliable Cold Storage, 50%
Cronk & Carrier Mfg. Co., No. 101, ₩ doz. $2.30
Richards' Bull Dog, Heavy, No. 125.....50&5%
Richards' Trump, No. 127.....$1.50

Leaders, Cattle—

Small.....*doz. 50¢; large, 60¢*
Covert Mfg. Co.:
Cotton, 45%; Hemp, 45%; Jute, 35%; Sisal, 20%.

Leathers, Pump—

See *Pumps—*

Lifters, Transom—

R. & E.....10%

Lines—

Wire Clothes, Nos.	*18*	*19*	*20*
100 feet	*$2.50*	*2.25*	*2.00*
75 feet	*$2.10*	*1.80*	*1.65*

Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3..40%
Solid Braided Masons'.....30%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50.....₩ gr. 20%
Masons' Lines, Shade Cord, &c.: White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50.....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25.....20%
Turner & Stanton Co.:
Solid Braided Chalk, Masons' and Awning Lines.....40%
Clothes Lines, White Cotton.....20%
Shade Cord, Cotton or Linen....20%

Locks— Cabinet—

Cabinet Locks.....*33⅓%*

Door Locks, Latches, &c —

NOTE.—Net Prices are very often made on these goods.
Reading Hardware Co.....40%
R. & E. Mfg. Co.....10%

Padlocks—

R. & E. Mfg. Co. Wrought Steel and Brass.....75&10%

Sash, &c.—

Iron' Patent:
Bronze and Brass, 55&5%; Crescent, 60%; Iron, 60%; Window Ventilating, 40&20%; Robinson Pat. Ventilating Sash Lock, 33⅓%.
Pullman Patent Ventilating Lock..35%
Reading Sash Locks.....40%

Machines—Boring—

Com. Upr't, without Augers.
$2.00@2.25
Com. Angl'r, without Augers,
$2.25@2.50
Swan's Improved.....40&10%
Jennings', Nos. 1 and 4.....25&7½%
Millers Falls.....5.75
Snell's, Upright, $2.65; Angular, $2.90

Corking—

Reisinger Invincible Hand Power.... ₩ doz. $18.00

Fence—

Williams' Fence Machines....each, $5.50

Hoisting—

Moore's Anti-Friction Chain Hoist.30%
Moore's Hand Hoist, with Lock Brake.....20%
Moore's Cyclone High Speed Chain Hoist.....25%

Ice Cutting—

Chandler's.....12½%

Washing

Boss Washing Machine Co.:	Per doz.
Boss No. 1	$57.00
Boss Rotary	$57.00
Champion Rotary Banner No. 1	$57.00
Standard Champion No. 1	$50.00
Standard Perfection	$27.00
Cincinnati Square Western	$33.00
Uneeda American, Round	$33.60

Mallets—

Hickory.....*45&5@50%*
Lignumvitæ.....*45&5@50%*
Tinners' Hickory and Applewood.....*doz. 45&5@50%*

Mangers, Stable—

Swett Iron Works.....50%

Mats, Door—

Acme Flexible Steel.....50%
Elastic Steel (W. G. Co.), new list.50%

Mattocks—

See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk.*

Mills, Coffee, &c.—

Enterprise Mfg. Co.....20@25%
National list Jan. 1, 1902.....30%
Parker's Columbia and Victoria..33⅓%
Parker's Box and Side.....50&10%
Swift, Lane Bros. Co.....30%

Motors, Water—

Divine's Red Devil.....30%
Lippincott's.....30%

Mowers, Lawn—

NOTE.—Net prices are generally quoted

Cheapest, 10-in., $2.00; 12-in., $2.10, etc.
Cheap, 10-in., $2.25; 12-in., $2.45, etc.
Better Grade, 10-in., $3.00; 12-in., $3.25, etc.

	12	*14*	*16*	*18-in.*
High Grade	*$4.50*	*4.75*	*5.00*	*5.25*
Continental	60%			
Great American	70%			
Great American Ball Br'g, new list	70%			
Quaker City	70%			
Pennsylvania	60%			

Pennsylvania, Jr., Ball Bearing, 50&10&5%
Pennsylvania Golf.....50%
Pennsylvania Horse.....33⅓&5%
Pennsylvania Pony.....40&5%
Granite State:
Style A, Low Wheel.....70%
Style B, Low Wheel.....70%
Style C, High Wheel, spcl. list, 70&10%
Style D, High Wheel, spcl. list..70%
Philadelphia:
Styles M., S., C., K., T....70&10&5%
Style A, all Steel.....60&10&5%
Style E, High Wheel.....40&10&5%
Drexel and Gold Coin, special list 40%
Horse.....40&5%
Pony.....40&5%
36-in. Horse.....30&10%
Eagle Horse.....30&5%
I. X. L. Horse.....50%

Nails—

Wire Nails and Brads, Miscellaneous.....*87½@87½&10%*
Cut and Wire. See *Trade Report.*
Hungarian, Finishing, Upholsterers' &c. See *Tacks.*

Horse—

Nos.	6	7	8	9	10	
Anchor	23	21	20	19	18	...40&5%
Coleman	13	12	12	11	11	.....net
New Haven..	23	21	20	19	18	...40&5%
Livingston ..	19	18	17	16	16	.....10%

Western.....₩ lb 8¼¢
Jobbers' Special Brands.....*per lb. 9@10¢*

Picture—

	1½	*2*	*2½*	*3*	*in.*
Brass H'd.	*45*	*.55*	*.60*	*.70*	*.. gro*
Por. Head..	*1.10*	*1.10*	*1.10*		*.. gro*

Nippers—

See *Pliers and Nippers.*

Nuts—

Cold Punched: *Off list.*
Square, Blank or Tapped..5.80¢
Hexagon, Blank or Tapped.6.30¢
Square, Blank or Tapped, C., T. & R.....*5.60¢*
Hexagon, Blank or Tapped. C., T. & R.....*6.30¢*
Hot Pressed:
Square, Blank.....*5.80¢*
Hexagon, Blank.....*6.30¢*
Square, Tapped.....*5.50¢*
Hexagon, Tapped.....*5.90¢*

Oakum—

Best.....*lb., 6½¢*
U. S. Navy.....*lb., 6¢*
Navy.....*lb., 5¢*
Plumbers' Spun Oakum..2¾@3¢

Oil Tanks—See *Tanks, Oil.*

Oilers—

Steel, Copper Plated.....*75%*
Chase or Paragon:
Brass and Copper.....*50&10%*
Zinc.....*65&10%*
Malleable, Hammers' Improved, Nos. 11, 12 and 13, 20%; Old Pattern, Nos. 1, 2, 3, 50%.
American Tube & Stamping Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%
Maple City Mfg. Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%

Openers— Can— *Per doz.*

Sprague, Iron Handle.....*30@35¢*
Sprague, Wood Handle.....*35@40¢*
Sardine Scissors.....*$1.75@$3.00*
Yankee Can and Bottle Opener, ₩ doz., net, $0.75; Little Gem, ₩ doz., net.....$0.65

Egg—

Hartigan Nickel Plate, ₩ doz., $2.00; Silver Plate, $4.00.

Packing—

Asbestos Packing, Wick and Rope.....*20@25¢*

Rubber—

(Fair quality goods.)

	1	*2*	*3*	*4*	*5*
Sheet, C. 1					*11@12¢*
Sheet, C. O. S.					*11@12¢*
Sheet, C. B. S.					*12@13¢*
Sheet, Pure Gum					*40@45¢*
Sheet, Red					*40@50¢*
Jenkins' '96, ₩ lb. 80¢					25%

Miscellaneous—

American Packing...lb. 7@10 ¢
Cotton Packing.....*lb. 16@25 ¢*
Italian Packing.....*lb. 9@12½¢*
Jute.....*lb. 4@ 4½¢*
Russia Packing.....*lb. 8@11 ¢*

Pails, Water, Well, &c.—

See *Buckets.*

Pans— Dripping—

Standard List.....*65&7½@70%*
Edwards, Royal Blue.....65&7½%

Fry—

Common Lipped:

Nos.	*1*	*2*	*3*	*4*	*5*
Per doz.	*$0.75*	*0.80*	*0.90*	*1.10*	*1.30*

Refrigerator, Galva.—

Inch	*12*	*14*	*16*	*18*
Per doz.	*$1.75*	*2.25*	*2.80*	*3.15*

Paper—Building Paper

Asbestos: *lb.*
Roll Board or Building Felt, 6 to 30 lb., per 100 sq. ft.3½@5¢
Roll Board or Building Felt, 3-32 and ⅛ in., 45 to 60 lb., per 100 sq. ft.....*6¢*
Mill Board, Sheet, 40 x 40 in., 1-32 to ½ in.....*3@5¢*

Per roll

Rosin Sized Sheathing: 500 sq. ft. Light weight, 25 lbs. to roll.....*48@58¢*
Medium weight, 30 lbs. to roll.....*56@70¢*
Heavy weight, 40 lbs. to roll.....*75@78¢*
Black Water Proof Sheathing, 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, $1.10; 4 ply, $1.25.
Deafening Felt, 9, 6 and 4½ sq. ft. to lb. ton.....*$34.50*
Red Rope Roofing, 250 sq. ft. per roll.....*$1.75*

Tarred Paper—

1 ply (roll 400 sq. ft.), ton.....
$34.00@38.00
2 ply, roll 108 sq. ft.....*65¢*
3 ply, roll 108 sq. ft.....*88¢*
Slater's Felt (roll 500 sq. ft.)..80¢

Sand and Emery—

Flint Paper and Cloth.50&10@—%
Garnet Paper and Cloth.....*25%*
Emery Paper and Cl'h..50&10@60%

Parers— Apple—

Goodell Co.:
Family Bay State.....₩ doz., $15.00
Improved Bay State.....₩ doz. $36.00
New Lightning.....₩ doz. $7.00
Turn Table '96.....₩ doz. $6.00
White Mountain.....₩ doz. $5.00
Bonanza Improved.....each $7.50
Dandy.....each $10.00
Eureka Improved.....each $20.00
New Century.....each $20.00
Ranger.....each $25.00
Livingston Nail Co.:
Daisy.....₩ doz. $4.00
Little Star.....₩ doz. $5.00
Rocking Table.....₩ doz. $6.20
Reading Hardware Co.:
Advance.....₩ doz. $4.00
Baldwin.....₩ doz. $4.00
Reading 72.....₩ doz. $3.25
Reading 78.....₩ doz. $6.25

Potato—

Saratoga.....₩ doz. $7.00
White Mountain.....₩ doz. $6.00

Picks and Mattocks—

(List Jan., 1908.)

List.....*70¢10@70¢10¢10%*
Cronk's Handled Garden Mattock, ₩ doz., No. 2, $2.60; No. 3, $6.40.

Pinking Irons—
See *Irons, Pinking.*

Pins, Escutcheon—
Brass .....50@50&10%
Iron, list Nov. 11, '85..60@60&10%

Pipe, Cast Iron Soil—
Standard, 2-6 in......60&10@—%
Extra Heavy, 2-6 in...70&10@—%
Fittings, Standard and Heavy, 75&10@—%

Pipe, Merchant—

	Consumers, Carloads. Steel. Blk. %	Galv. %	Iron. Blk. %	Galv. %
⅜ & ¼ in...	64	48	62	..
⅜ in.....	66	52	64	50
½ in.....	68	56	66	54
¾ to 6 in...	72	62	70	60
7 to 12 in....	69	54	67	52

Pipe, Vitrified Sewer—
Carload lots.
Standard Pipe and Fittings, 8 to 24 in., f.o.b. factory:
First-class .....77@78%
Second-class .....80@81%

Pipe, Stove—

	Per 100 joints. C. L.	L. C. L.
Edwards' Nested:		
5 in., Standard Blue....	$6.25	$7.25
6 in., Standard Blue....	6.75	7.75
7 in., Standard Blue....	7.75	8.75
5 in., Royal Blue.....	7.00	8.00
6 in., Royal Blue.....	7.50	8.50
7 in., Royal Blue.....	8.50	9.50
Wheeling Corrugating Co.'s Nested:		
5 in., Uniform Color..	$6.15	$7.15
6 in., Uniform Color..	6.65	7.65
7 in., Uniform Color..	7.65	8.65

Planes and Plane Irons—
Wood Planes—
Bench, first qual.....30@30&10%
Bench, second qual...40@40&10%
Molding .....25@25&10%
Chapin-Stephens Co.:
Bench, First Quality.....30%
Bench, Second Quality.....40%
Molding and Miscellaneous.....25%
Toy and German.....30%
Unica 60%

Iron Planes
Chaplin's Iron Planes.....50&10%
Union 60%

Plane Irons—
Wood Bench Plane Irons, list Dec. 12, '05.....25%
Buck Bros.....30%
Chapin-Stephens Co.....25%
Union 60%
L. & I. J. White.....20&5@25%

Planters, Corn, Hand—
Kohler's Eclipse.....⅌ doz. $8.00

Plates—
Felloe .....lb. 4@4¼¢

Pliers and Nippers—
Button Pliers....75&5@75&10&5%
Gas Burner, per doz., 5 in., $1.25 @ $1.30; 6 in., $1.45 @ $1.50.

Gas Pipe..	7	8	10	12-in.
	$2.00	$2.25	$2.75	$3.50

Acme Nippers.....50&5%
Cronk & Carrier Mfg. Co.:
American Button.....60%
Improved Button.....75&10%
Cronk's 60%
No. 80 Linemen's.....50%
Stub's Pattern.....45%
Combination and others.....33⅓%
Heller's Farriers' Nippers, Pincers and Tools.....40&5@40&10&5%
P., S. & W. Tinners' Cutting Nippers 40%
Wm. Schollhorn Co.:
Bernard, 35%; Elm City, 35%; Paragon, 50%; Lodi, 55%.
Swedish Side, End and Diagonal Cutting Pliers.....50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds.....40%

Plumbs and Levels—
Chapin-Stephens Co.:
Plumbs and Levels.....30@30&10%
Chapin's Imp. Brass Cor..40@40&10%
Pocket Levels.....30@30&10%
Extension Sights.....30@30&10%
Machinists' Levels.....40@40&10%
Disston's Plumbs and Levels....60&10%
Disston's Pocket Levels.....60&10%
Stanley's Duplex.....33⅓%
Woods' Extension.....33⅓%

Points, Glaziers'—
Bulk and 1-lb. papers....lb. 9 ¢
½-lb. papers.....lb. 9½¢
¼-lb. papers.....lb. 10 ¢

Police Goods—
Manufacturers' Lists...25@25&5%
Tower's 25%

Polish—Metal, Etc—
Prestoline Liquid, No. 1 (¼ pt.), ⅌ doz., $3.00; No. 2 (1 qu.), $9.00..40%
Prestoline Paste.....60%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ⅌ doz. 50¢; ⅌ gro. $4.50; ½ lb boxes, ⅌ doz. $1.25; 1 lb boxes, ⅌ doz. $2.25.
U. S. Liquid, 8 oz. cans, ⅌ doz., $1.25.
Barkeepers' Friend Metal Polish, ⅌ doz., $1.75.

Stove—
Black Eagle Benzine Paste, 5 lb cans, ⅌ lb 10¢
Black Eagle, Liquid, ⅛ pt. cans.. ⅌ doz. 75¢
Black Jack Paste, ⅝ lb cans, ⅌ gr. $9.00
Black Kid Paste, 5 lb can....each, $0.65
Ladd's Black Beauty Liquid, per 100 tins.....$6.75
Joseph Dixon's, ⅌ gr. $5.75.....10%
Dixon's Plumbago.....⅌ lb 8¢
Fireside .....⅌ gr. $2.50
Gem, ⅌ gr. $4.50.....10%
Japanese .....⅌ gr. $3.50
Jet Black.....⅌ gr. $3.50
Peerless Iron Enamel, 10 oz. cans.. ⅌ doz. $1.50

Poppers, Corn—
1 qt. Square..doz.$0.80; gro.$8.75
1 qt. Round..doz.$0.90; gro.$10.00
1½ qt. Square.doz.$1.00; gro.$11.00
2 qt. Square..doz.$1.25; gro.$13.50

Post Hole and Tree Augers and Diggers—
See also *Diggers, Post Hole, &c.*

Posts, Steel—
Steel Fence Posts, each, 5 ft., 42¢; 6 ft., 46¢; 6½ ft., 48¢.
Steel Hitching Posts.....each $1.30

Potato Parers—
See *Parers, Potato.*

Pots, Glue—
Enameled .....35&10%
Tinned .....50&10%

Powder—
In Canisters:
Duck, 1 lb.....each 45¢
Fine Sporting, 1 lb....each 75¢
Rifle, ½-lb.....each 15¢
Rifle, 1-lb.....each 25¢
In Kegs:
12½-lb. kegs.....$3.50
25-lb. kegs.....$4.50
King's Semi-Smokeless:
Keg (25 lb bulk).....$6.50
Half Keg (12½ lb bulk).....$3.50
Quarter Keg (6¼ lb bulk).....$1.90
Case 24 (1 lb cans bulk).....$8.50
Half case (1 lb cans bulk).....$4.50

King's Smokeless:	Shot Gun.	Rifle.
Keg (25 lb bulk).....	$12.00	$15.00
Half Keg (12½ lb bulk)...	6.25	7.75
Quarter Keg (6¼ lb bulk).	3.25	4.00
Case 24 (1 lb cans bulk)..	14.00	17.00
Half case 12 (1 lb c. bk)..	7.25	8.75

Presses—
Fruit and Jelly—
Enterprise Mfg. Co.....20@25%

Seal Presses—
Morrill's No. 1, ⅌ doz., $20.00.....50%

Pruning Hooks and Shears
See *Shears.*

Pullers, Nail—
Cyclops 50%
Miller's Falls, No. 3, ⅌ doz., $12.00.. 33⅓&10%
Morrill's No. 1, Nail Puller, ⅌ doz. $20.00 .....50%
Pearson No. 1, Cyclone Spike Puller, each $30.00.....50%
The Scranton Co. Case Lots:
No. 2B (large).....$5.50
No. 3B (small).....$5.00
Smith & Hemenway Co.:
Diamond B.....70%
Giant 50%
Staple Pullers, Utica and Davison 60%

Pulleys, Single Wheel—

Inch	1¼	1¾	2	3
Awning or Tackle, doz.	$0.30	.45	.60	1.05
Hay Fork, Swivel or Solid Eye. doz., 4 in., $1.25; 5 in., $1.55				
Inch	2	2¼	2½	
Hot House, doz.	$0.65	.85	1.20	
Inch	1¼	1½	1¾	2
Screw, doz.	$0.16	.19	.25	.30
Inch	1¾	2	2¼	2½
Side, doz.	$0.25	.40	.55	.60
Inch	1½	1¾	2	2½

Sash Pulleys—
Common Frame; Square or Round End, per doz, 1¾ and 2 in.....17@20¢
Auger Mortise, no Face Plate per doz., 1¾ and 2 in....20@21¢
Acme, No. 35..1¾ in., 19¢; 2 in., 20½¢
American Pulley Co.:
Wrought Steel American Plain Axle .....50&10%
Wrought Steel, Eagle.....17@20¢
Fox-All-Steel, Nos. 3 and 7, 2 in.... ⅌ doz. 50%
Grand Rapids All Steel Noiseless..50%
Niagara, No. 25, 1¾ in., 19¢; 2 in.....20½¢
No. 26 Tror..1¾ in., 14½¢; 2 in., 16½¢
Star, No. 26..1¾ in., 19¢; 2 in., 20½¢
Tackle Blocks—See Blocks.

Pumps—
Cistern 60%
Pitcher Spout.....75&5@75&10%
Wood Pumps, Tubing, &c....50%
Barnes Dbl. Acting (low list)....40&5%
Barnes Pitcher Spout.....5&10%
Contractors' Rubber Diaphragm No. 2, B. & L. Block Co.....$16.00
Daisy Spray Pump.....⅌ doz. $6.50
Flint & Walling's Fast Mail Hand, (low list).....50%
Flint & Walling's Fast Mail (low list) 50%
Flint & Walling's Tight Top Pitcher. .....75&10%
National Specialty Mfg. Co., Measuring, Nos. 2, $6.00; 3, $5.50.....30%
Myers' Pumps (low list).....40&5%
Myers' Power Pumps.....40&5%
Myers' Spray Pumps.....40&5%

Pump Leathers—
Plunger and Valve Leathers—Per gro.:

No.....	1	2	3	4	30%
	$5.00	6.00	7.00	8.00	
Cup Leathers—Per 100:					
Inch....	2½	3	3½	4	
	$5.00	7.00	9.00	12.00	

Punches—
Saddlers' or Drive, good..... doz. 50@75¢
Spring, single tube, good quality $1.75
Revolving (4 tubes)....doz.$3.50
Bemis & Call Co.'s Cast Steel Drive.50%
Morrill's Nos. 1AA, 1A, 1B, 1C, 1D, $15.00.....50%
Hercules, 1 die, each $5.00.....50%
Niagara Hollow Punches.....40%
Niagara Solid Punches.....55&10%
Wm. Schollhorn Co.:
Belt and Ticket, Bernard, 35%; Paragon, 50%; Lodi.....55%
Tinners' Hollow, P., S. & W. Co..40%
Tinners' Solid, P., S. & W. Co., ⅌ doz., $1.44.....40%

Rail—Barn Door, &c.—
Sliding Door, Painted Iron.... 2½@2¾¢
Sliding Door, Wrought Brass, 1⅛ in., lb., 35¢.....30%
Allith Mfg. Co.: Reliable Hanger Track 50%
Cronk's:
Double Braced Steel Rail..⅌ ft. 3¼¢
O. N. T. Rail.....$3.12
Griffin's:
xxx, ⅌ 100 ft., 1 x 3-16 in., $3.25; 1¼ x 3-16 in., $3.75.
Hinged Hanger, ⅌ 100 ft., 1 x 3-16 in., $3.50; 1¼ x 3-16 in., $4.00.
Lane's:
Hinged Track, ⅌ 100 ft. $3.45
O. N. T., ⅌ 100 ft., 1 in., $3.00; 1¼ in., $3.45; 1½ in., $4.00.
Standard, 1¼ in.....⅌ 100 ft. $4.00
Lawrence Bros.:
1 x 3-16 in., ⅌ 100 ft., $7.50; 1¼ x 3-16 in., $8.75.....55&7½%
McKinney's:
Hinged Hanger Track, ⅌ ft., 11¢, 60&5%
1 x 3-16 Track.....55&7½%
Myers' Stayon Track.....60&5%
Richards' Mfg. Co.:
Common, 1 x 3-6 in., $3.00; 1¼ x 3-16, $3.25; 1¼ x 3-16, $3.50.
Special Hinged Hanger Rail...60&10%
Lag Screw Rail, No. 65.....50%
Gauge Trolley Track, ⅌ ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢.
No. 50.....60&10%
Nos. 61, $3.00; 62, $3.25; 63, $3.50; 64, $4.00; 45, $3.25; 46, $3.50; 49, No. 1, $3.25; 49, No. 2, $3.50.

Rakes—
NOTE.—Many goods are sold at net prices.
Fort Madison Red Head Lawn....$3.25
Fort Madison Blue Head Lawn....$2.70
Cronk's:
Steel Garden: Champion, 75%; Ideal, 80%; Victor.....60&25%
Queen City Lawn, ⅌ doz., 20 teeth, $2.85; 24, $3.00.....net
Anticlog Lawn, ⅌ doz.....$4.00
Malleable Garden.....70&10%
Ideal Steel Garden, ⅌ doz., 12 teeth, $15.00; 14, $16.00; 16, $18.00.....80%
Kohler's:
Lawn Queen, 20-tooth....⅌ doz. $3.15
Lawn Queen, 24-tooth....⅌ doz. $3.25
Paragon, 20-tooth.....⅌ doz. $2.70
Paragon, 24-tooth.....⅌ doz. $2.75
Steel Garden, 14-tooth....⅌ doz. $2.40
Malleable Garden, 14-tooth, ⅌ doz. $2.00@2.25

Rasps, Horse—
Disston's 75%
Heller Bros.'.....70&5@70&10&5%
Liveright Bros.' Gold Medal.70&10@75%
McCaffrey's American Standard, 60&10&5%
New Nicholson.....70&10@75%
See also Files.

Razors—
Liana Bo-ras-ic.....60%
Fox Razors, ⅌ doz., No. 42, $30.00; No. 44, $20.00; No. 82, Platina, $25.00. } 40%
Red Devil.....65%

Reels, Fishing—
Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, M 16, Q 16, A 16, B 16, 4008, Rubber, Populo, Nickeled Populo.....20%
Aluminum German Silv., Bronze.25%
1240 N, 124 N.....20%
3004 N, 06 N, 6 RM, G 8.....25%
4 N, 6 PN, 24 N, 96 PN.....20%
2904 P, 33¼%; 2904 PN, 33¼%; 0924 N, 33¼%; 02084 N, 33¼%; 002904 PN, 33¼%; 802 N, 33¼%.
986 PN, 2904 N, 974 PN.....25%
5009 PN, 5009 N.....20%
Competitor 102 P, 102 PN, 202 P, 202 PN, 102 PR.....20%
304 P, 304 PN, 00304 P, 00304 PN.33¼%

Registers—*List July 1, 1903.*
Japanned, Electroplated and Bronzed .....70@70&10%
White Porcelain Enamel..50&10%
Solid Brass or Bronze Metal..40%

Revolvers—
Single Action.....95¢@$1.00
Double Action, except 44 cal..$2.00
Double Action, 44 caliber....$2.00
Automatic $4.00
Hammerless $4.50

Riddles, Hardware Grade
16 in.....per doz.$2.50@$2.75
17 in.....per doz.$2.75@$3.00
18 in.....per doz.$3.00@$3.25

Rings and Ringers—
Bull Rings—

	2	2½	3 inch.
Steel	$0.70	0.75	0.80 doz
Copper	$1.10	1.25	1.65 doz.

Hog Rings and Ringers—
Hill's Rings, gro. boxes....$4.25
Hill's Ringers, Gray Iron, doz..66¢
Hill's Ringers, Malleable Iron.. doz.80¢
Blair's Rings.....per gro.
Blair's Ringers.....per doz.75¢
Brown's Rings.....per gro.$5.25
Brown's Ringers....per doz.75¢

Rivets and Burrs—
Copper.....50%
Carriage, Coopers', Tinners, &c.: Black .....70&10%
Metallic Tinned.....70%

Bifurcated and Tubular—
Assorted in Boxes.
Bifurcated, per doz. boxes, pasteboard boxes, 50 count, 23@25¢; Tin boxes, 100 count, 29@32¢.
Tubular, per doz. boxes, 50 count, 29@32¢; 100 count, 51@58¢.

Rollers—
Cronk's Stay, No. 50.....$1.00
Cronk's Brinkerhoff No. 55, $0.60; No. 56, $0.75; No. 60.....$0.75
Lane's Stay.....40%
Richards' Stay:
Handy Adj. and Reversible No. 53.75¢
O. K. Adj. and Reversible No. 58.50¢
Lag Screw, Nos. 55 and 57.....50%
Underwriters', Nos. 59, 60.....50%
Favorite, No. 54.....60%

Rope—
Manila, 7-16 in. diam. and larger: Pure .....lb., 10½@11½¢
Sisal, 7-16 in. diam. and larger: Pure .....lb., 7½@8¢
Sisal, 7-16 in. diam. and larger: No. 2 quality.....lb., 6½@7¢
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse: Mixed .....lb., 6½@7¢
Pure .....lb., 7¾@8¼¢
Sisal, Tarred, Medium Lath Yarn, Coarse and Untarred: Mixed .....lb., 5¼@5¾¢
Pure .....lb., 6½¢
Cotton Rope: Best, ¼-in. and larger...18@20¢
Medium, ¼-in. and larger.16@17¢
Common, ¼-in. and larger..10¢
In coils, ½¢ advance.
Jute Rope: Thread, No. 1, ¼-in. & up, lb., 6¼¢
Thread, No. 2, ¼-in. & up, lb., 5¼¢

Wire Rope—
Galvanized .....87½@21½%
Plain .....45@21½%

Ropes, Hammock—
Covert Mfg. Co.:
Jute, 35%; Sisal.....20%

Rules
Boxwood .....60@60&10%
Ivory .....35&10@35&10&5%
Chapin-Stephens Co.:
Boxwood 60%
Flexifold 40%
Ivory .....25@25&10%
Miscellaneous .....50@50&10%
Stephens' Combination.....55%
Stationers' .....50@50&10%
Keuffel & Esser Co.:
Folding, Wood.....
Folding, Steel.....33⅓&10%
Lufkin's Steel.....
Lufkin's Lumber.....50&10%
Unson Nut Co.:
Boxwood .....60@60&10%
Ivory .....35&10@35&10&10%

Sash Balances—
See *Balance, Sash.*

Sash Locks—See *Locks, Sash.*

Sash Weights—
See *Weights, Sash.*

Sausage Stuffers or Fillers
See *Stuffers or Fillers, Sausage.*

Saw Frames—
See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—

Atkins':
Circular 45%
Band ..... 50@50&10%
Butcher Saws 50%
Cross Cuts 35%
One-Man Cross Cut 40%
Narrow Cross Cut 50%
Hand, Rip and Panel ..... 35&5%
Miter Box and Compass 40%
Mulay, Mill and Drag 45%
Wood Saws ..... 40&10%
Chapin-Stephens Co.:
Turning Saws and Frames..30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws.....30&10&10%
Disston's:
Circular, Solid and Ins'ted Tooth.50%
Band, 2 to 18 in. wide 60%
Band, ¼ to 1¾ 60%
Crosscuts 45%
Narrow Crosscuts 50%
Mulay, Mill and Drag 50%
Framed Woodsaws 25%
Woodsaw Blades 25%
Woodsaw Rods, Tinned 15%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 76, 77, 8 ..... 25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination 30%
Compass, Key Hole, &c. 25%
Butcher Saws and Blades 30%
C. E. Jennings & Co.'s:
Back Saws 16⅔%
Butcher Saws ..... 25&7½%
Compass and Key Hole Saws, 33⅓&7½%
Framed Wood Saws ..... 25&7½%
Hand Saws 12½%
Wood Saw Blades ..... 33⅓&7½%
Millers Falls:
Butcher Saws ..... 15&10%
Star Saw Blades ..... 15&10%
Massachusetts Saw Works:
Victor Kitchen Saws ..... 40&10&50%
Butcher Saws Blades ..... 35@40%
Peace & Richardson's Hand Saws...30%
Simonds':
Circular Saws 45%
Crescent Ground Cross Cut Saws..30%
One-Man Cross Cuts ..... 40&10%
Gang Mill, Mulay and Drag Saws.45%
Band Saws 50%
Back Saws ..... 25@25&7½%
Butcher Saws ..... 35@35&7½%
Hand Saws ..... 25@25&7½%
Hand Saws, Bay State Brand 45%
Compass, Key Hole, &c..25@25&7½%
Wood Saws ..... 40&7½%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws 50%

Hack Saw Blades and Frames—

Atkins' Hack Saw Blades A A A..25%
Disston's:
Concave Blades 25%
Keystone Blades 35%
Hack & ? Frames 30%
Simonds File Co. 35%
C. E. Jennings & Co.'s
Hack Saw Frames, Nos. 175, 180 ..... 40&7½%
Hack Saws, Nos. 175, 180, complete, 40&7½%
Goodell's Hack Saw Blades ..... 40&10%
Griffin's Hack Saw Frames..35&5&10%
Griffin's Hack Saw Blades....35&5&10%
Star Hack Saws and Blades..... 15&10%
Sterling Hack Saw Blades....30&10&5%
Sterling Hack Saw Frames..30&10&10%
Sterling Power Hack Saw Machines, each, No. 1, $25.00; No. 2, $30.00..10%
Victor Hack Saw Blades 20%
Victor Hack Saw Frames 40%
Whitaker Mfg. Co.:
National Hand Blades 40%
National Hand Frames ..... 30&5%
National Power Blades ..... 30&10%

Scroll—

Barnes, No. 7, $15 ..... 25%
Barnes' Scroll Saw Blades 40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20 ..... 20%
Lester, complete, $10.00 ..... 15&10%
Rogers, complete, $3.50 and $4.00.. 15&10%

Scales—

Family, Turnbull's....50@50&10%
Counter:
Hatch, Platform, ½ oz. to ¼ lbs. .....doz., $5.50
Two Platforms, ½ oz. to 8 lbs. .....doz., $16.00
Union Platform, Plain.$1.70@1.90
Union Platform, Stpd.$1.85@2.15
Chatillon's:
Eureka 25%
Favorite 40%
Crocers' Trip Scales 50%
The Standard Portables 40%
The Standard R. R. and Wagon ..... 50&10%

Scrapers—

Box, 1 Handle.....doz. $2.00@2.25
Box, 2 Handle.....doz. $2.50@2.60
Ship....Light, $2.00; Heavy, $4.50
Chapin-Stephens Co., Box..30@30&10%
Richards Mfg. Co., Foot 60%

Screws—Bench and Hand

Bench, Iron, doz., 1 in., $2.50@2.75; 1⅛, $3.00@3.25; 1¼, $3.50@3.75
Bench, Wood .....20@20&10%
Hand, Wood...70&10@70&10&10%
Chapin-Stephens Co., Hand..... 70@70&10&2½%

Coach, Lag and Hand Rail—

Lag, Cone Point.....80@80&5%
Coach, Gimlet Point, 75&10@75&10&5%
Hand Rail.....70&10@75%

Jack Screws—

Standard List.....70&10@75%
Millers Falls ..... 50&10&10%
Jwett Iron Works ..... 70@75%

Machine—

Cut Thread, Iron, Brass or Bronze:
Flat Head or Round Head, 50@50&10%
Fillister Head.....40@40&10%
Rolled Thread, F. H or R. H., Iron .....75&10%
F. H. or R. H., Brass, Nos. 8 to 14.....65&10%

Set and Cap—

Set (Iron).....75&10&7½%
Set (Steel), net advance over Iron 25%
Sq. Hd. Cap.....70&10&7½%
Hex. Hd. Cap.....70&10&7½%
Rd. Hd. Cap.....50&7½%
Fillister Hd. Cap.....60&7½%

Wood—

List July 23, 1903.
Flat Head, Iron.....87½&5@..%
Round Head, Iron.....85&5@..%
Flat Head, Brass.....80&5@..%
Round Head, Brass..77½&5@..%
Flat Head, Bronze....75&5@..%
Round Head, Bronze.72½&5@..%
Drive Screws.....87½&5@..%

Scroll Saws—

See *Saws, Scroll.*

Scythes— *Per doz.*

Grass, No. 1, Plain.....$7.00@7.50
Clipper, Bronzed Webb..$7.25@7.75
No. 3 Clipper, Pol'd Webb.. $7.50@8.00
No. 6 Clipper and Solid Steel, $7.75@8.25
Bush, Weed and Bramble, Nos. 11, 12 and 13.....$7.25@7.75
Grain, No. 1.....$9.00@9.50
Bronzed Webb, No. 1...$9.25@9.75
Nos. 3 and 4 Clipper, Grain.. $9.50@10.00
Solid Steel, No. 6....$10.00@10.50

Seeders, Raisin—

Enterprise ..... 25@30%

Sets— Awl and Tool—

Fray's Adj. Tool Handles, Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7..... 50%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No. 5, $18..20&10%

Garden Tool Sets—

Ft. Madison Three Plows, Hoe, Rake and Shovel.....₩ doz sets $9.00

Sets, Nail—

Octagon .....gro. $3.50@3.75
Buck Bros. 71½%
Cannon's Diamond Point, ₩ gro, $12. 40&10%
Maybew's .....₩ gro. $9.00
Snell's Corrugated, Cup Pt.....40&10%
Snell's Knurled, Cup Pt.....40&10%
Victor Knurled Cup Pt... ₩ gro. $7.50

Rivet—

Regular list.....75@75&10%

Saw—

Atkin's:
Criterion 40%
Adjustable 40%
Disston's Star, Monarch and Triumph 30%
Morrill's No. 1..... $15.00
Nos. 3 and 4, Cross Cut.....$20.60
No. 5, Mill..... $30.00
Nos. 10, 11, 95..... $15.60
No. 1 Old Style..... $10.00
Special $16.25
Giant Royal Cross Cut.....₩ doz. $8.00
Royal, Hand..... ₩ doz. $4.50
Taintor Positive..... ₩ doz. $4.75

Shaving—

Fox Shaving Sets, No. 30 ..... ₩ doz., net, $24.00
Smith & Hemenway Co.'s..... 75%

Sharpeners, Knife—

Pike Mfg. Co.:
Fast Cut Pocket Knife Hones, ₩ doz.....$1.50
Mounted Kitchen Sand Stone, ₩ doz.....$1.50
Natural Grit Carving Knife Hones, ₩ doz.....$3.00
Quick Cut Emery Carving Knife Hones, ₩ doz.....$1.50
Quick Edge Pocket Knife Hones, ₩ doz.....$2.50

Skate—

Smith & Hemenway Co., Eureka..50%

Shaves, Spoke—

Iron .....doz. $1.25
Wood .....doz. $2.00
Bailey's (Stanley R. & L. Co.)..... 45%
Chapin-Stephens Co.....30@30&10%
Goodell's, ₩ doz. $9.00..... 15&10%

Shears—

Cast Iron.. 7	8	9 in.	
Best $16.00	18.00	20.00	*gro.*
Good ...$13.00	15.00	17.00	*gro.*
Cheap .. $5.00	6.00	7.00	*gro.*

Straight Trimmers, &c.:
Best quality Jap....70@70&10%
Best quality, Nickel..60@60&10%
Tailors' Shears.....40@40&10%
Acme Cast Shears..... 40@40&5%
Heinisch's Tailor's Shears..... 10%
Wilkinson Shear & Cutlery Co.:
Sheep, 1900 list..... 30&10&5%
Grass ..... 50&10%
Horse or Mule..... 50&10%
J. Wiss & Sons Co.:
Best Quality Jap'd..... 60&10%
Best Quality Nickeled..... 50&10%
Tailors' 25%

Tinners' Snips—

Steel Blades.....20&5@20&10%
Steel Bevel Blades.....40&10@50%
Forged Handles, Steel Blades, Berlin, 50%
Heinisch's Snips..... 40%
Jennings & Griffin Mfg. Co.'s 6½ to 10 in..... 33⅓&7½%
Niagara Snips..... 40%
P., S. & W. Forged Handles, 25%; W. R. W..... 40&10%
J. Wiss & Sons Co.:
Wiss Forged Steel..... 25%

Pruning Shears—

Cronk's Hand Shears..... 33⅓%
Cronk's Wood Handle Shears..... 33⅓%
Disston's Combined Pruning Hook and Saw, ₩ doz. $18.00..... 25%
Disston's Pruning Hook only, ₩ doz. $12.00 ..... 25%
John T. Henry Mfg. Co.:
Pruning Shears, all grades..... 40%
P., S. & W Co..... 40&10%
Columbian Cutlery Co.:
Hedge, Wilcut Brand..... 60&10%
Lawn and Border, Wilcut Brand. 60&10%

Sheaves— Sliding Door—

Reading 40%
R. & E. list..... 15%

Sliding Shutter—

Reading list..... 40%
R. & E. list..... 10%

Shells—Shells, Empty—

Brass Shells, Empty:
Climax, 10 and 12 gauge..... 65&10%
Club, Rival, 65&5%; First Quality, 60&5%
Paper Shells, Empty:
New Rapid, 10, 12, 16 and 20 gauge, 25&10%
Climax, 10 and 12 gauge; Acme, 10, 12, 16 and 20 gauge; Ideal, 10, 12, 16 and 20 gauge; Leader grade, 25&5%
Union, League, 12 and 12 gauge; Rival Grade..... 25%
New Climax, Defiance, 10, 12, 14, 16 and 20 gauge; Climax, 14, 16 and 20 gauge..... 20&5%
Challenge, Monarch, 10, 12, 16 and 20 gauge; League, Union, 14, 16 and 20 gauge; Repeater Grade..20%

Shells, Loaded—

Loaded with Black Powder..40%
Loaded with Smokeless Powder, medium grade.....40&5%
Loaded with Smokeless Powder, high grade.....40&10&10%
Union Metallic Cartridge Co.:
New Club, Black Powders..... 40%
Nitro Club, Smokeless Powders.40&5%
Arrow, Smokeless Powders.40&10&10%
Winchester:
Smokeless Repeater Grade.....40&5%
Smokeless Leader Grade...40&10&10%
Black Powder..... 40%

Shingles, Metal— Per Sq.

Edwards Mfg. Co.:	Painted.	Galv.
14 x 20	$4.25	$6.00
10 x 14	4.50	6.25
7 x 10	4.75	6.50

Wheeling Corrugating Co.:

Dixie, 14 x 20 in...	$4.25	$5.50
Dixie, 10 x 14 in....	4.50	6.00
Dixie, 7 x 10 in....	5.00	6.75

Shoes, Horse, Mule, &c.—

F.o.b. Pittsburgh:
Iron .....per keg. $4.10
Steel .....per keg. $3.85
Burden's, all sizes.....₩ keg $3.90

Shot—

25-lb. bag.
Drop, up to B.....$1.85
Drop, B and larger..... 2.10
Buck 2.10
Chilled 2.10
Dust 2.30

Shovels and Spades—

Association List, Nov. 15, 1902..40%
Avery Stamping Co..... 40%

Snow Shovels—

Long Handle.....$3.25@$3.50
Wood and Mail, D. Handle. $3.75@$4.00

Sieves and Sifters—

Hunter's Imitation..... gro. $9.50@10.00
Hunter's Genuine..... per gro. $12.00@12.50

Sifters, Ash—

Acme Ball Bearing Sales Co., Acme Automatic Ash Sifter, each, $3.25; ₩ doz..... $39.00

Sieves, Seamless Metallic

	—Per dozen.—			
Mesh	*14*	*16*	*18*	*20*
Iron Wire...	*$1.05*	*1.05*	*1.10*	*1.20*
Tinned Wire.	*$1.15*	*1.15*	*1.20*	*1.30*

Sieves, Wooden Rim—

Nested, 10, 11 and 12 Inch.
Mesh 18, Nested....doz. $0.90@0.95
Mesh 20, Nested....doz. $1.00@1.05
Mesh 24, Nested....doz. $1.30@1.40

Sinks, Cast Iron—

Painted, Standard list:
12 x 12 to 22 x 36 in.....60%
20 x 40 to 24 x 50 in.....50%
24 x 60 to 24 x 120 in.....30%
Barnes' low list:
Up to and including 20 x 36 in.50&5%
20 x 40 to 24 x 50 in..... 45%
NOTE.—There is not entire uniformity in lists used by jobbers.

Skeins, Wagon—

Cast Iron.....70@75&10%
Steel .....40@45%

Slates, School—

Factory Shipments.
"D" Slates.....50@50&10%
Eureka, Unexcelled Noiseless.. 60&5 tens
Victor A, Noiseless..60&4 tens &5%

Slaw Cutters—See *Cutters.*

Snaps, Harness—

German .....40@40&10%
Covert Mfg. Co.:
Derby, 25%; Yankee, 30&2%; Yankee Roller, 30&2%
High Grade, 40%; Trojan..... 40%
Jockey 25%

Snaths—

Scythe .....55@60%

Snips, Tinners—See *Shears.*

Spoons and Forks—

Silver Plated—

Good Quality.....50&10@60&5%
Cheap .....60@60&10%
International Silver Co.:
1847 Rogers Bros., 40&10%; Rogers & Hamilton.....50&10%
Rogers & Bro., William Rogers' Eagle Brand..... 50&10%
Anchor, Rogers Brand..... 60%
Wm. Rogers & Son..... 60&10%

Miscellaneous

German Silver.....60@60&5%

Tinned Iron—

Teas .....per gro. 50@55¢
Tables .....per gro. $0.90@$1.00

Springs— Door—

Bardsley's Spring and Check..... 40%
Chicago (Coil)..... 40&10%
Gem (Coil)..... 20%
Pullman (Coil)..... 35%
Reliance (Coil)..... 40&10%
Star (Coil)..... 30%
Torrey's Rod, 39 in.....₩ doz. $1.10

Carriage, Wagon, &c.—

1¼ in. and Wider: Per 100 lb.
Black .....$4.75@5.00
Half Bright.....$4.75@5.00
Bright .....$5.25@5.50
Painted Seat Springs:
1½ x 2 x 26.....per pr. 49@52¢
1½ x 3 x 28.....per pr. 73@77¢

Sprinklers, Lawn—

American Foundry & Mfg. Co.:
Cactus, 65%; Japanese, 70%; National, ₩ doz..... $12.00
Enterprise ..... 25@30%
Philadelphia No. 1, ₩ doz. $12; No. 2, $15; No. 3, $20..... 30%

Squares—

Nickel plated.. } *List Jan. 5, 1900.*
Steel and Iron. } *80@80&5%*
Rosewood Hdl. Try Square and T-Bevels .....60&10&10@70%
Iron Hdl. Try Squares and T-Bevels .....40&10@40&10&10%
Disston's Try Squares and Bevels, Rosewood Handle, 60&10%; Iron Stock and Bevel..... 15%

Squeezers, Lemon

Wood, Common, gro., No. 0, $5.25@$5.50; No. 1, $6.25@$6.50.
Wood, Porcelain Lined:
Cheap .....doz. $1.00
Good Grade.....doz. $1.25
Tinned Iron.....doz. $0.75@1.25
Iron, Porcelain Lined...doz. $1.75

Staples—

Barbed Blind.....85&5@85&10%
Electricians' .....80&10&10@85%
Fence Staples, Plain, $2.15; Galvanized $2.45
Poultry Netting Staples..... per lb. 3¼@3½¢

Steels, Butchers'—

Dick's 30%
Foster Bros. 30%

Steelyards— ....30@30&10%

Stocks and Dies—

Blacksmiths' .....50@50&10%
Curtis Rev'ble Ratchet Die Stock..25%
Derby Screw Plates..... 25%
Green River..... 25%
Lightning Screw Plate..... 25%
Little Giant..... 25%
Reece's New Screw Plate..... 25%

Stoners, Cherry—

Enterprise ..... 25@30%

Stones—Oil, &c.

Pike Mfg. Co., 1907 list: ₩ lb
Arkansas St. No. 1, 3 to 5½ in.. 42.00
Arkansas St. No. 1, 5½ to 8 in. $3.50
Arkansas Slips No. 1..... $1.60
Lily White Washita, 4 to 8 in.60¢
Rosy Red Washita, 4 to 8 in..60¢
Washita St., Extra, 4 to 8 in.50¢
Washita St., No. 1, 4 to 8 in.40¢
Washita St., No. 2, 4 to 8 in.25¢
Lily White Slips..... 90¢
Rosy Red Slips..... 90¢
Washita Slips, Extra..... 80¢
Washita Slips, No. 1..... 70¢
Washita Slips, No. 2..... 40¢
India Oil Stones (entire list)....33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit..... 40%
Quickcut Emery and Corundum Axe Stone, Double Grit..... 33⅓%
Quickcut Emery Rubbing Bricks..40%
Hindostan No. 1, R'g'lar.₩ lb 8¢
Hindostan No. 1, Small..₩ lb 10¢
Axe Stones (all kinds)..... 33⅓%
Turkey Oil Stones, Extra, 5 to 8 in.....₩ lb, 80¢
Queer Creek Stones, 4 to 8 in.20¢
Queer Creek Slips..... 40¢
Sand Stone..... 6¢

Scythe Stones—

Pike Mfg. Co., 1901 list:
Black Diamond S. S., ₱ gro. $12.00
Lamoille S. S., ₱ gro. $11.00
White Mountain S. S., ₱ gro. $9.00
Green Mountain S. S., ₱ gro. $6.00
Extra Indian Pond S. S., ₱ gro. $7.50
No. 1 Indian Pond S. S., ₱ gro. $7.00
No. 2 Indian Pond S. S., ₱ gro. $4.50
Leader Red End S. S., ₱ gro. $4.50
Quick Cut Emery, ₱ gro. $10.00
Pure Corundum, ₱ gro. $18.00
Crescent, $7.00
Emery Scythe Rifles, 2 Coat, $8
Emery Scythe Rifles, 3 Coat, $10
Emery Scythe Rifles, 4 Coat, $12
Balance of 1904 list 33⅓%
Electro (Artificial), ₱ gro., $12.00 33⅓%
Lightning (Artificial), ₱ gro., $18.00 33⅓%

Stoppers, Bottle—

Victor Bottle Stoppers, ₱ gro. $9.00

Stops— Bench—

Millers Falls 15&10%
Morrill's, ₱ doz., No. 1, $10.00 50%
Morrill's, No. 2, $12.50 50%

Door—

Chapin-Stephens Co. 50@50&10%

Plane—

Chapin-Stephens Co. 20%

Straps— Box—

Acme Embossed, case lots. 20&10&10%
Cary's Universal, case lots. 20&10&10%

Stretchers, Carpet—

Cast Iron, Steel Points, doz. 60@60&10%
Socket . . . . . doz. $1.66
Excelsior Stretcher and Tack Hammer Combined, ₱ doz. $6.00. 20%

Stuffers, Sausage—

Enterprise Mfg. Co. 25@25&7½%
National Specialty Co., list Jan. 1, 1902 50&5%
P., S. & W. Co. 40&10&5%

Sweepers, Carpet—

Bissell Carpet Sweeper Co.: ₱ doz.
Superba, Crotch Mahogany $36.00
Triumph, Fancy Veneers $33.00
Parlor Queen, Fig. Rosewood $30.00
Elite, Hungarian Ash $29.00
Am. Queen, Fig. Mahogany $27.00
Ideal, Bird's-Eye Maple $25.00
Grand Rapids, Nickel, $21.00; Japan $22.00
Standard, Nickel, $22.00; Japan $20.00
Crown Jewel, Nickel, $21.00; Jap. $19.00
Crystal, Glass Top $36.00
Grand, 17 in. wide $36.00
Club, 24 in. wide $54.00
Hall, 28 in. wide $60.00

NOTE.—Rebates: 50c per dozen on three dozen lots; $1 per dozen on five-dozen lots; $2 per dozen on ten-dozen lots; $2.50 per dozen on twenty-five dozen lots.

Tacks, Finishing Nails, &c.

American Carpet Tacks . . . 90&40%
American Cut Tacks . . . . . 90&40%
Swedes' Cut Tacks . . . . . 90&40%
Swedes' Upholsterers' . . . . . 90&55%
Gimp Tacks . . . . . 90&50%
Lace Tacks . . . . . 90&50%
Trimmers' Tacks . . . . . 90&40%
Looking Glass Tacks 65%
Bill Posters' and Railroad Tacks, 90&50&10%
Hungarian Nails . . . . . 80&20%
Finishing Nails 70%
Trunk and Clout Nails . . . 80&10%

NOTE.—The above prices are for Straight Weights.

Miscellaneous—

Double Pointed Tacks . . . . . 90&5 tens @—%

See also Nails, Wire.

Tanks, Oil and Gasoline—

Wilson & Friend Co.: Gal.	Gasoline	Oil
30	$2.75	$3.00
60	$3.50	$4.00
110	$5.00	$5.75

Tapes, Measuring—

American Asses' Skin . . 50@—%
Patent Leather . . . . . 25@30&5%
Steel . . . . . 33 1-3&5%
Chesterman's . . . . . 25@25&5%
Keuffel & Esser Co.:
Favorite, Ass Skin . . . . . 40&10@50%
Favorite, Duck and Leather . . . . . 25&5@25&10%
Metallic and Steel, lower list, 35@35&5%; Pocket, 35@35&5%.
Lufkin's:
Asses' Skin . . . . . 40&10@50%
Metallic . . . . . 30@30&5%
Patent Bend, Leather . . . . 25&5@25&10%
Pocket . . . . . 40@40&5%
Steel . . . . . 33⅓@35%
Wiebusch & Hilger:
Chesterman's Metallic, No. 34L, etc. 25%
Chesterman's Steel, No. 1038L, etc. 35%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger . . . per 100 lbs. $2.75@$3.00

Thermometers—

Tin Case, Cabinet, Flange, Dairy, &c. . . . . 30@33⅓%

Ties, Bale—Steel Wire—

Single Loop . . . . . 80&10&5%
Monitor, Cross Head, &c. 70&2½%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.

See *Benders and Upsetters, Tire.*

Tools—Coopers'—

L. & I. J. White. . . . . 20@20&5%

Haying—

Myers' Hay Tools. 45%

Miniature—

Smith & Hemenway Co.'s, Davidson, ₱ doz., Nickel Plated, $1.50; Gold Plated. $2.00

Saw—

Atkins' Cross Cut Saw Tools. . . . 35&5%
Simonds' Improved. 33⅓%
Simonds' Crescent. 25%

Ship—

L. & I. J. White. 35%

Transom Lifters—

See *Lifters, Transom.*

Traps—Fly—

Balloon, Globe or Acme, doz. $1.15@$1.25; gro. . . . . $11.50@12.00
Harper, Champion or Paragon, doz. $1.25@1.40; gro. $13.00@13.50

Game—

Imitation Oneida . . . . . 75&10%
Newhouse . . . . . 40&10&5
Hawley & Norton. 65%
Victor . . . . . 75@75&10%
Oneida Community Jump. 60%
Hector . . . . . 75@75&10%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 12¢
Mouse, Round or Square Wire, doz. 85@90¢
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, ₱ doz., $13.25. . $11.50 doz.
No. 3, Rat, ₱ doz., $6.50. . . $5.75 doz.
No. 3½, Rat, ₱ doz., $5.25. $4.70 doz.
No. 4, Mouse, ₱ doz., $3.85. $3.00 doz.
No. 5, Mouse, ₱ doz., $3.00. $2.25 doz.
Oneida Community:
Out o' Sight, Mouse, ₱ doz. . . . $0.60
Out o' Sight, Rat, ₱ doz. 1.25
Easy Set, Mouse, ₱ doz. 35
Easy Set, Rat, ₱ doz. 1.00
Wood Choker, Rat, ₱ doz. holes. .12
Premier Tin Choker, 5 hole, ₱ doz. traps. 75

Trowels—

Disston Brick and Pointing. 25%
Disston Plastering. 20%
Disston "Standard Brand" and Garden Trowels. 30%
Kohler's Steel Garden Trowels, ₱ gro., 5 in., $4.80; 6 in., $6.00.
Never-Break Steel Garden Trowels. . ₱ gro. $6.00
Woodrough & McParlin, Plastering. 25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern. . . . . 50&10%
Western Pattern. . . . . 60&10%
Handy Trucks. . . . . ₱ doz. $16.00
Grocery . . . . . ₱ doz. $15.00
McKinney Trucks. . . . . each, net $10.00
Model Stove Trucks. . . . . ₱ doz. $18.50

Tubs, Wash—

M'f'gr's list, price per gross.
No. 0 1 2 3
Galvanized $67 $79 $89 $99 10&5%

Twine, Miscellaneous—

Flax Twine:
No. 9, ¼ and ½-lb. Balls. 23@25¢
No. 12, ¼ and ½-lb. Balls. 21@23¢
No. 18, ¼ and ½-lb. Balls. 18@20¢
No. 24, ¼ and ½ -lb. Balls. 17½@19½¢
No. 36, ¼ and ½-lb. Balls. 17@19¢
Chalk Line, Cotton ½-lb. Balls . . . . . 26@31¢
Cotton Mops, 6, 9, 12 and 15 lb. to doz. . . . . 11@19¢
Cotton Wrapping, 5 Balls to lb., according to quality . . . 15½@23¢
American 2-Ply Hemp, ¼ and ½-lb. Balls . . . . . 14½@15½¢
American 3-Ply Hemp, 1-lb. Balls . . . . . 15½@16½¢
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine) . 10½@11½¢
India 3-Ply Hemp, 1-lb. Balls . . . . . 10½@11½¢
India 3-Ply Hemp, 1½-lb. Balls. 10@11¢
2, 3, 4 and 5-Ply Jute, ½-lb. Balls . . . . . 13½@14½¢
Mason Line, Linen, ½-lb. Bls. 47¢
No. 26 Mattress, ¼ and ½-lb. Balls, according to quality, 30@60¢
Wool, 3 to 6 ply . . . . B 9¢; A 10¢

Vises—

Solid Box . . . . . 50@50&10%

Parallel—

Athol Machine Co.:
Simpson's Adjustable. 40%
Standard 40%
Amateur 25%
Columbian Hdw. Co. 40%
Fisher & Norris Double Screw, net, each, Nos. 2, $10.50; 3, $16.00; 4, $20.50; 5, $27.00.
Fulton Mach. & Vise Co.:
Reed, Swivel. 25%
Star, Solid Jaw. 40%
Hollands':
Machinists' . . . . . 40@40&5%
Keystone . . . . . 65&5@70%
Lewis Tool Co.:
Adjustable Jaw. 30%
Monarch, 50%; Solid Jaw. 50%
Massey Vise Co.:
Clincher 40%
Perfect, 15%; Lightning Grip. . . . 15%
Merrill's 20%
Millers Falls Oval Slide Pattern. 60&10%
Parker's:
Victor, 20@25%; Regulars. . . . . 20@25%
Vulcan's . . . . . 40@45%
Combination Pipe. . . . . 55@60%
Prentiss . . . . . 20@25%
Rock Island. 25%
Suedike's X. L. 33⅓%
Stephens' 33⅓%

Saw Filers—

Disston's D 3 Clamp and Guide, ₱ doz., $24.00, 30%; Clamps. 30%
Perfection Saw Clamps, ₱ doz. . . . $4.50
Reading 60%

Wood Workers—

Fulton Mach. & Vise Co.:
Reed 25%
Star 40%
Massey Vise Co.:
Lightning Grip, 15%; Perfect. 15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—

Holland's Combination Pipe. . 60@60&5%
Massey's Quick Action Pipe. 40%
Parker's Combination Pipe: 87 Series, 60%; 187 Series, 60&5%; No. 870 40%.
Rock Island Pipe. 25%

Wads—*Price per M.*

B. E., 11 up . . . . . 60¢
B. E., 9 and 10 . . . . . 70¢
B. E., 8 . . . . . 80¢
B. E., 7 . . . . . 80¢
P. E., 11 up $1.00
P. E., 9 and 10 . . . . . 1.25
P. E., 8 . . . . . 1.50
P. E., 7 . . . . . 1.50
Dis. 15%
Ely's B. E., 11 and larger. $1.70@1.75
Ely's P. E., 12 to 20 . . . . $3.00@3.25

Ware, Hollow—Cast Iron, Hollow—

Stove Hollow Ware:
Enameled . . . . . 45&10%
Ground . . . . . 50&5%
Plain or Unground. 60%
Country Hollow Ware, per 100 lbs. $3.00
White Enameled Ware:
Maslin Kettles . . . . . 65&10%
Covered Wares:
Tinned and Turned . . . . . 35&10%
Enameled . . . . . 45&10%
See also *Pots, Glue.*

Enameled—

Agate Nickel Steel Ware. 33⅓%
Iron Clad Ware. . . . . 70&10%
Lava and Volcanic, Enameled. . 40&10%

Tea Kettles—

Galvanized Tea Kettles:

Inch	6	7	8	9
Each	45¢	50¢	55¢	65¢

Steel Hollow Ware—

Avery Spiders and Griddles. . 65@65&5%
Avery Kettles. 60%
Porcelained . . . . . 50&30&50&10%
Never Break Spiders and Griddles. . 65&5%
Never Break Kettles. 60%
Solid Steel Spiders and Griddles. 65&5%
Solid Steel Kettles. 60%

Warmers, Foot—

Pike Mfg. Co., Soapstone. . . . 40@40&10%

Washboards—

Solid Zinc: ₱ doz.
Crescent, family size, bent frame. $4.05
Red Star, family size, stationary protector $4.05
Double Zinc Surface:
Saginaw Globe, family size, stationary protector. $3.55
Cable Cross, family size, stationary protector. $3.60
Single Zinc Surface:
Naiad, family size, open back, perforated $3.00
Single Saginaw Globe. $2.85
Brass Surface:
Brass King, Single Surface, open back $4.05
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface $3.60
Glass Surface:
Glass King, Single Surface, open back $3.95
Enamel Surface:
Enamel King, Single Surface, ventilated back. $3.95

Washers—Leather, Axle—

Solid . . . . . 90@90&10%
Patent . . . . . 90@90&5%
Coil: ⅜ 1 1⅛ 1¼ Inch. 9¢. 10¢. 11¢. 14¢. per box

Iron or Steel—

Size bolt. . . . 5-16 ⅜ ½ ⅝ ¾
Washers. . . . $4.90 4.00 2.70 2.50 2.30
The above prices are based on $6.50 off list.
In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.

Cast Washers—

Over ½ inch, barrel lots . . . . . per lb. 1¾@2¢

Wedges—

Oil Finish . . . . . lb., . . @3¢

Weights—Hitching—

Covert Mfg. Co. . . . . 30&2%

Sash—

Per net ton, f.o.b. factory:
Eastern District . . . $25.00@$28.00
Southern Territory. $22.00@$24.50
Western and Central Districts . . . . . $22.50@$23.50

Wheels, Well—

8-in., $2.00; 10-in., $2.45; 12-in., $3.25; 14-in., $4.45.

Wire and Wire Goods—

Bright and Annealed:
6 to 9 . . . . . 72&10&7½%
10 to 18 . . . . . 72½&10&10%
19 to 26 . . . . . 75&10&10&2½%
27 to 36 . . . . . 77½&7½%
Galvanized:
6 to 9 . . . . . 72½&10%
10 to 14 . . . . . 72½&10&5%
15 to 16 . . . . . 72½&10&5%
17 to 18 . . . . . 72½%
19 to 26 . . . . . 70&5&2½%
27 to 36 . . . . . 65&10&10%
Coppered:
6 to 9 . . . . . 65&10&10%
10 to 14 . . . . . 70&10&5%
15 to 18 . . . . . 65&10&10&10%
19 to 26 . . . . . 70&5&2½%
27 to 36 . . . . . 72½&10&2½%
Tinned:
6 to 18 . . . . . 67&10&10%
Brass . . . . . 17¼¢ lb., base
Copper . . . . . 32¢ lb., base
Cast Steel Wire 50%

Spooled Wire—

Annealed and Tinned, 70&10&10&10%
Brass and Copper. . . 60&10&10&10%
Retailers' Assortments, per box, $2.10@$2.40

Wire Clothes Line, see Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—

Steel Wire Goods. . . . . 90&25@—%
Brass Wire Goods . . . . 90@90&10%
Brass Cup and Shoulder Hooks, 80&15%

Wire Cloth and Netting—

Galvanized Poultry Netting, 80&2½@80&7½%
Painted Screen Cloth, 100 ft., $1.35
Standard Galv. Hardware Grade: Per 100 sq. ft.
Nos. 2, 2½ and 3 Mesh $2.75
Nos. 4 and 5 Mesh $3.00
No. 6 Mesh $3.25
Nos. 7 and 8 Mesh $3.75

Wire, Barb—See *Trade Report*

Wrenches—

Agricultural . . . . . 80&10%
Alligator or Crocodile. . 70&10@75%
Baxter Pattern S Wrenches . . . 70&5@70&10%
Drop Forged S . . . . . 45@45&5%
Acme . . . . . 60&10%
Alligator Pattern, 70%; Bull Dog. . 70%
Bemis & Call's:
Adjustable S, 40%; Adjustable S Pipe, 40%; Briggs Pattern, 40%; Combination Bright, 40%.
Steel Handle Nut. 50%
Combination Black. . . . . 40&5%
Merrick Pattern. 50%
Boardman's 40%
Coes' Genuine Knife Hdl. . 40&10&5&5%
Coes' Genuine Steel Hdl. . 40&10&5&5%
Coes' Genuine Key Model. . 40&10&5&5%
Coes', Genuine Hammer Handle. . . . . 40&10&5&5%
Coes' "Mechanics'". . . 40&10&10&5&5%
Donohue's Engineer. . . . . 40&10%
Eagle 70%
Gem Pocket. 30%
Hercules 10%
W. & B. Machinist:
Case lots. . . . . 50&5%
Less than case lots. 50%
W. & B. Railroad Special:
Case lots. 50%
Less than case lots. . . . . 40&10&5%
Solid Handles, P., S. & W., 50&10%; full cases. . . . . 50&10&5%
Stillson 65%
Uwanta Wrench Co.:
Railroad Special, Iron Handle, 40&10&5%
Other Wrenches. 50%
Vulcan and Agrippa Chain. 50%
Whitaker Machinists':
Case lots. . . . . 50&10%
Less than case lots. 50%

Wrought Goods—

Staples, Hooks, &c., list March 17, '92. . . . . 85&10&10%

Zinc—*(Cask lots at mill.)*

Sheet . . . . . per 100 lb. $7.00